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THE

PROCEEDINGS

OF THE

ENTOMOLOGICAL SOCIETY

OF

LONDON

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TRANSACTIONS AND PROCEEDINGS OF THE SOCIETY.

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OF THE

ENTOMOLOGICAL SOCIETY OF LONDON.

HONORARY FELLOWS.

Date of Election.

1905 **Bolivar**, Ignacio, *Museo nacional de Historia natural, Hipodromo,* 17, *Madrid, Spain.*

*1911 **Comstock**, Prof. J. H., *Cornell University, Ithaca, New York, U.S.A.*

*1894 **Forel**, Professor Auguste, M.D., *Yvorne, Canton de Vaud, Switzerland.*

1925 **Gestro**, Prof. R., *Direttore del Museo Civico di Storia Naturale, Genova, Italy.*

1931 (1929) **Horn**, Dr. Walther, 20, *Gosslerstrasse, Berlin-Dahlem, Germany.*

1926 **Horvath**, Dr. Geza, *Museum Nationale Hungaricum, Budapest, Hungary.*

1915 ‡ **Howard**, Dr. L. O., *Ex-Chief, Bureau of Entomology, U.S. Dept. of Agriculture, Washington, U.S.A.*

1914 **Lameere**, Professor A., 74, *rue Defarq, Bruxelles, Belgium.*

1918 **Marchal**, Dr. Paul, 45, *rue de Verrières, Antony, Seine, France.*

1931 (1877) **Oberthür**, M. Réné, *Rennes, Ille-et-Vilaine, France.*

1931 **Rebel**, Prof. H., *Naturhistorischen Museum, Burgring* 7, *Vienna I, Austria.*

1913 **Semenoff Tian-Shanski**, A. P., *Vassili Ostrov,* 8 *lin.,* 39, *Leningrad, U.S.S.R.*

1931 **Silvestri**, Prof. F., *R. Istituto Superiore Agraria, Portici, Naples, Italy.*

1931 **Wheeler**, Prof. W. M., Ph.D., Sc.D., LL.D., *Museum of Comparative Zoology, Harvard College, Cambridge, Mass., U.S.A.*

SPECIAL LIFE FELLOWS.

Date of Election.

1926 (1891) **Frohawk**, F. W., *Essendene, Cavendish-road, Sutton, Surrey.*

1923 (1889) **Johnson**, The Rev. W. F., M.A., *Roxboro' Terrace, Rostrevor, Co. Down, Ireland.*

1929 (1920) ‡ **Meldola**, Mrs. E. F., 6, *Brunswick-square,* W.C. 1.

1926 (1890) **Newstead**, Prof. R., M.Sc., F.R.S., A.L.S., Hon. F.R.H.S., *St. Mary's Cottage,* 67, *Handbridge, Chester.*

1931 (1905) **Powell**, H., *Pharmacie du Croissant, Meknès-Medina, Morocco.*

FELLOWS.

(*The names of those who have not yet paid either the Entrance Fee or the first year's subscription are not included.*)

*Marked * died during the year* 1931.
Marked † have compounded for their Annual Subscriptions.
Marked ‡ have been formally admitted into the Society (*to Dec.* 1931).

Date of Election.

1913 ‡ Adams, B. G., *The Old Rectory, Swell, Fivehead, Somerset.*
1902 ‡ Adkin, B. W., "*Highfield,*" *Penbury, Tunbridge Wells.*
1885 ‡ Adkin, Robert (V.-Pres., 1922, 1928; Council, 1901–2, 1911–13, 1921–3, 1927–9), *Hodeslea, Meads, Eastbourne.*
1921 Alexander, Prof. C. P., *Fernald Hall, Massachusetts Agricultural College, Amherst, Mass., U.S.A.*
1931 Alfieri, Anastase, *P.O. Box* 430, *Cairo, Egypt.*
1920 ‡ Altson, A. M., 91, *St. James' Mansions, Eloff St., Johannesburg, S. Africa.*
1924 ‡ Amirthalingam, C.
1911 Anderson, T. J., *Box* 323, *Nairobi, Kenya Colony.*
1919†‡Andrewes, Dr. C. H., 32, *Ossulton-way,* N. 2.
1910†‡Andrewes, H. E. (Council, 1920–2), 8, *North-grove, Highgate,* N. 6.
1922 ‡ Andrewes, H. L., *The Warren, Bere Regis, Wareham, Dorset.*
1899 ‡ Andrews, Henry W. (Council, 1930–), 6, *Footscray-road, Eltham,* S.E. 9.
1901 ‡ Anning, William, 15, *Arthur-street West,* E.C. 4.
1908 † Antram, Charles B., *c/o Hongkong and Shanghai Banking Corporation, P.O. Box* 158, *Calcutta, India.*
1930 Armstrong, K. F., *John Winthrop House, Harvard University, Cambridge, Mass., U.S.A.*
1927 ‡ Armstrong, R. R., B.A., M.D., B.Ch., 3a, *Newsted-road, Lee,* S.E. 12.
1913 ‡ Armytage, Edward O., *c/o The Westminster Bank, Ltd.,* 25, *Sussex-place,* S.W. 7.
1907 ‡ Arnold, G., D.Sc., A.R.C.S., Box 240, *Bulawayo, South Africa.*
1899†‡Arrow, G. J. (Council, 1905–7), 9, *Rossdale-road, Putney,* S.W. 15; and *British Museum* (*Natural History*), *Cromwell-road,* S.W. 7.
1922 Arthur, Francis, M.R.C.S., L.R.C.P., 395, *Bethnal Green-road,* E. 2.
1911 ‡ Ashby, E. B., 36, *Bulstrode-road, Hounslow, Middlesex.*
1907†‡Ashby, Sidney R., 37, *Hide-road, Headstone, Harrow.*
1925 Ashworth, J. H., *Walton Fold, Longridge, Preston, Lancs.*
1921 Atkinson, D. J., *Ataran Forest Division, Moulmein, Burma.*
1927 ‡ Attia, R., A.R.C.S., B.Sc., *Plant Protection Section, Ministry of Agriculture, Cairo, Egypt.*
1928 ‡ Aubertin, Miss D., *British Museum* (*Natural History*), *Cromwell-road,* S.W. 7.
1930 Austin, M. D., *Dept. Economic Entomology, South-Eastern Agricultural College, Wye, Kent.*
1913 Avinoff, A., *Carnegie Museum, Pittsburg, U.S.A.*

1904†‡Bagnall, Richard S., D.Sc., F.R.S.E., F.L.S.

1909 ‡ Bagwell-Purefoy, Capt. Edward, F.Z.S. (Council, 1930–), *The Cottage, East Farleigh, Maidstone.*

1903–1913, 1924 :
‡ Baldock, G. R., *Oakburn Villa,* 467, *Hertford-road, Enfield Highway.*

1916 ‡ Balfour, Miss Alice, *Whittingehame, Haddington, Scotland.*

1921 ‡ Balfour-Browne, Prof. W. A. F., F.R.S.E., F.L.S., F.Z.S. (Council, 1925–7), *Winscombe Court, Winscombe, Somerset.*

1912 ‡ Ballard, E., *Department of Agriculture, Jerusalem.*

1890 Barclay, Francis H., F.G.S., *The Warren, Cromer.*

1902 ‡ Barraud, P. J., *Central Research Institute, Kasauli, Punjab, India.*

1907 ‡ Bartlett, H. Frederick D., *Island of St. Helena, S. Atlantic.*

1908 Bayford, E. G., 2, *Rockingham-street, Barnsley.*

1912 ‡ Baynes, E. S. A., *Monkshatch Cottage, Compton, Guildford, Surrey.*

1896†‡Beare, Prof. Sir T. Hudson, B.Sc., F.R.S.E. (V.-Pres., 1910; Council, 1909–11, 1925–7), 10, *Regent-terrace, Edinburgh.*

1912 Bedford, Gerald, *Division of Veterinary Services, P.O., Ondestepoort, Pretoria, S. Africa.*

1913 Bedford, Capt. H. W., *W.T.R. Laboratories, Khartoum, Sudan.*

1899 ‡ Bedwell, Ernest C. (V.-Pres., 1922; Council, 1917–19, 1922–4, 1929–31), *Bruggen, Brighton-road, Coulsdon, Surrey.*

1920 ‡ Beeson, C. F. C., *Indian Forest Service, Forest Research Institute, Dehra Dun, U.P., India.*

1927 ‡ Bell, J. H., *Maiden Lodge, Caterham Valley, Surrey.*

1904 Bengtsson, Simon, Ph.D., *Universitetsbibliothek, Lund, Sweden ;* Curator, Entomological Collection of the University.

1915 Benham, Prof. W. B., M.A., D.Sc., F.R.S., *University of Otago, Dunedin, New Zealand.*

1925 ‡ Benson, R. B., M.A., *British Museum* (*Nat. Hist.*), *Cromwell-road.,* S.W. 7.

1906 ‡ Bentall, E. E., *The Grove, Witham, Essex.*

1913 ‡ Best-Gardner, Charles C.

1885 ‡ Bethune-Baker, George T., F.L.S., F.Z.S. (Pres., 1913–14; V.-Pres., 1910–11, 1915; Council, 1895, 1910–12, 1915, 1919–21), 9, *Eversfield-road, Eastbourne.*

1929 Bewsher, Maj. F. W., O.B.E., D.S.O., M.C., F.Z.S., 1*st Bn. R. Fusiliers, Kamptee, C.P., India.*

1891 ‡ Blaber, W. H., F.L.S., 34, *Cromwell-road, Hove, Sussex.*

1904 ‡ Blair, Kenneth G., B.Sc. (Council, 1918–20), *Claremont,* 120, *Sunningfields-road, Hendon,* N.W. 4.

1904 ‡ Bliss, M. F., M.C., M.R.C.S., L.R.C.P., *Branston, nr. Rugby.*

1903 Bogue, W. A., 34, *Handen-road, Lee,* S.E. 12.

1929 Bolivar y Pieltain, Prof. C., *Museo Nacional de Ciencias Naturales, Madrid.*

1921 ‡ Bolton-King, E., *Christ Church, Oxford.*

1902 ‡ Bostock, E. D., *Oulton Cross, Stone, Staffs.*

1921 Bouck, Baron J., *Springfield, South Godstone, Surrey.*

1894 † Bowles, E. Augustus, M.A., *Myddelton House, Waltham Cross.*

1912 † Bowring, C. Talbot, *St. Francis, Benfield-way, Portslade, nr. Hove, Sussex.*

1921 ‡ Box, H. E., *Antigua Sugar Factory, Antigua, B.W.I.*

1910 Boyd, A. Whitworth, *Frandley House, nr. Northwich, Cheshire.*
1920 Boyd, Major J. E. M., M.C., *The British Military Hospital, Ferozepore, Punjab, India.*
1905 Bracken, Charles W., B.A., 16, *De la Hay Villas, Plymouth.*
1919 ‡ Bradley, Prof. J. Chester, M.Sc., Professor of Entomology and Curator of Invertebrate Zoology, *Cornell University, Ithaca, New York, U.S.A.*
1920 ‡ Brenchley, Dr. Winifred E., D.Sc., F.L.S., *Rothamsted Experimental Station, Harpenden, Herts.*
1930 Breyer, Adolfo (Jun.), *Florida* 414, *Buenos Aires, Argentina.*
1930 Breyer, Alberto, *Florida* 414, *Buenos Aires, Argentina.*
1894 ‡ Bright, P. M., "*Nethercourt,*" 60, *Christchurch-road, Bournemouth.*
1924 ‡ Brindley, Mrs. M. D., 25, *Madingley-road, Cambridge.*
1909 ‡ Britten, Harry, 22, *Birch-grove, Levenshulme, Manchester.*
1925 ‡ Brooks, C. J., 11, *Carlton Mansions, West End-lane,* N.W. 6.
1902 ‡ Broughton, Brig.-Gen. T. D., R.E., *Stone House, Pewsey, Wilts.*
1919 Brown, J. M., B.Sc., F.L.S., 176, *Carterknowle-road, Millhouses, Sheffield.*
1910 Browne, H. B., M.A., *Kenilworth, Scatcherd-lane, Morley, Yorks.*
1909 Bryant, Gilbert E., 82, *Rivermead Court, Hurlingham,* S.W.
1919 ‡ Buckhurst, A. S., *Pathological Laboratory, Milton-road, Harpenden, Herts.*
1930 Bucknill, The Rev. E. G., M.A., 234, *The Bluff, Yokohama, Japan.*
1907 Bulleid, Arthur, F.S.A., *Dimboro, Midsomer Norton, Somerset.*
1929 Burdett, E. F., 70, *Hamilton-crescent, S. Harrow.*
1922 Burns, A. N., Sugar Experiment Station, *Mackay, N. Queensland, Australia.*
1896†‡Burr, Malcolm, D.Sc., F.G.S., A.R.S.M. (V.-Pres., 1912; Council, 1903–4, 1910–12), *United University Club, Pall Mall East,* S.W. 1; *Trans. to :— Moscow, Petrovskaia Agricultural Academy, Prof. V. F. Boldyrev.*
1920 Burras, A. E., 3, *Connaught-road, North End, Portsmouth.*
1909 ‡ Burrows, The Rev. C. R. N., *The Vicarage, Mucking, Stanford-le-Hope, Essex.*
1922 ‡ Bushby, L. C., 11, *Park-grove, Bromley, Kent.*
1920 ‡ Bushell, Capt. H. S., *Ravensholt, Harrow-on-the-Hill.*
1922 Butler, A. E., *c/o Westminster Bank, Ltd., Clevedon, Somerset.*
1914 † Butterfield, R., Curator, *Corporation Museum, Keighley, Yorks.*
1912†‡ Buxton, P. A., M.A. (Council, 1926–28), *Grit Howe, Gerrard's Cross, Bucks.*

1902 ‡ Cameron, Malcolm, M.B., R.N. (Council, 1919–20), 15, *Teesdale-road, Leytonstone,* E. 11.
1913 ‡ Cameron, W. P. L., *Gezira Research Farm, Wad Medani, Blue Nile Province, Sudan.*
1923 ‡ Campbell-Taylor, J. E., *Barclay's Bank House, Pembroke Dock, S. Wales.*
1910 Carlier, E. Wace, M.D., F.R.S.E., *Morningside, Granville-road, Dorridge, Warwickshire,* and *The University, Birmingham.*
1924 ‡ Carlier, S. E. Wace, *Morningside, Granville-road, Dorridge, Warwickshire.*
1910†‡Carpenter, G. D. Hale, D.M., M.B.E., *Penguelle, Hid's Copse-road, Cumnor Hill, Oxford.*
1895 ‡ Carpenter, George H., D.Sc., M.R.I.A., *The Manchester Museum, The University of Manchester.*

1915 Carr, Prof. J. W., M.A., F.L.S., F.G.S., Hon. F.R.H.S., Professor of Biology, *University College*, and Director Emeritus of the Public Natural History Museum, *Wollaton Hall, Nottingham.*
1912 Carter, H. F., *The Office of Medical Entomologist, Torrington-square, Colombo, Ceylon.*
1906 ‡ Carter, H. J., B.A., *Garrawillah, Kintore-street, Wahroonga, Sydney, N.S.W.*
1921 Castle, Miss Amy, *Dominion Museum, Wellington, New Zealand.*
1921 ‡ Cator, Douglas, 13, *Westminster-mansions, Gt. Smith-street*, S.W. 1.
1889†‡Cave, Charles J. P.
1920 ‡ le Cerf, F., Curator of Lepidoptera in the Paris Museum, 13, *rue Guy de la Brosse, Paris.*
1930 Champernowne, A. M., *Mount Wear, Countess Wear, Nr. Exeter.*
1914 ‡ Champion, H. G., M.A., *Forest Research Institute, Dehra Dun, U.P., India.*
1919 Chatterjee, N. C., B.Sc., *Forest Research Institute, Dehra Dun, U.P., India.*
1923 Chatterjee, S. N., *Forest Research Institute, Dehra Dun, U.P., India.*
1897 ‡ Chawner, Miss Ethel F., *Tarrystone House, Cookham, Berks.*
1913 ‡ Cheavin, W. H. S., F.C.S., F.R.M.S., 19, *Rosendale-road, W. Dulwich*, S.E. 21.
1919 Cheesman, Miss L. Evelyn, 63, *Longridge-road*, S.W. 5.
1920 ‡ Cheetham, C. A., *Austwick, via Lancaster.*
1889 Christy, William M., M.A., F.L.S., *Watergate, Emsworth.*
1909 Clark, Lt.-Col. C. Turner, F.Z.S., *The Hutch, Shirley Warren, Southampton.*
1923 Clarke, C. E., 51, *King Edward-road, Dunedin, New Zealand.*
1929 Clarkson, Miss Lucy I., *Apipucos, Recife (Pernambuco), Brazil.*
1914 ‡ Cleare, L. D., Jr., *Dept. of Agriculture, Georgetown, British Guiana.*
1922 Clutten, Wm. George, 136, *Coal Clough-lane, Burnley.*
1908 Clutterbuck, C. Granville, 23, *Heathville-road, Gloucester.*
1908 Clutterbuck, Sir Peter H., *Pensbury, Walton-on-Thames.*
1904 ‡ Cockayne, E. A., M.A., M.D., F.R.C.P. (Council, 1915–17, 1926–28), 116, *Westbourne-terrace*, W. 2.
1920 Cockcroft, T., 111, *Owen-street, Wellington South, New Zealand.*
1917 ‡ Cockerell, Prof. T. D. A., *University of Colorado, Boulder, Colorado, U.S.A.*
1914 Coleman, Leslie C., *Dept. of Agriculture, Bangalore, Mysore, India.*
1922 ‡ Collenette, C. L., *Ashburton Hotel, The Terrace, Richmond, Surrey.*
1899 ‡ Collin, James E. (President, 1927–8; V.-Pres., 1913, 1923, 1929; Council, 1904–06, 1913–15, 1923–25, 1929), *Raylands, Newmarket.*
1918 Comstock, Dr. J. A., *c/o Los Angeles Museum, Exposition Park, Los Angeles, California, U.S.A.*
1924 ‡ Cooke, Brig.-Gen. B. H., C.M.G., C.B.E., D.S.O., *Inniscrone, Datchet, Bucks.*
1926 Cooper, Mrs. J. Omer, B.A., 23, *Leazes-terrace, Newcastle-on-Tyne.*
1921 Coote, F. D., 71, *Fenchurch-street*, E.C. 3.
1924 Corbett, G. H., B.Sc., Government Entomologist, S.S., and F.M.S., *Kuala Lumpur, F.M.S.*
1916 Cornford, The Rev. Bruce, 43, *Havelock-road, Portsmouth.*
1921 ‡ Corporaal, J. B., *Zoological Museum, Plantage Middenlaan* 53, *Amsterdam, C.*
1924 ‡ Cott, Hugh B., M.A., F.R.P.S., F.Z.S., *The Elms, Elmlea-avenue, Stoke Bishop, Bristol.*

1923 Cottam, R., *Entomological Dept., Wellcome Tropical Research Laboratory, Khartoum, Sudan.*

1920 ‡ Cotterell, G. S., A.R.C.S., Box 23, *Dept. of Agriculture, Aburi, Gold Coast, B.W.A.*

1928 Covell, Major G., I.M.S., M.D., *Malaria Survey of India, Kasauli, Punjab, India.*

1913 Coward, T. A., F.Z.S., 36, *George-street, Manchester.*

1931 Cowland, J. W., *Wellcome Tropical Research Laboratories, Khartoum, Sudan.*

1931 Cowley, John, B.A., 59, *Hills-road, Cambridge.*

1931 Cox, Bevan C., *The Fishery, Mapledurham, Oxon.*

1923 ‡ Cox, L. G., 9, *Chichester-terrace, Brighton.*

1920 ‡ Crabbe, E., 52, *Sarsfield-road, Balham,* S.W. 12.

1895 Crabtree, B. H., *Holly Bank, Alderley Edge, Cheshire.*

1919 Crampton, Prof. G. Chester, *Massachusetts Agricultural College, Amherst, Mass., U.S.A.*

1922 ‡ Crawford, Wm. Monod, B.A., *Orissa, Marlborough-park, Belfast.*

1928 ‡ Crewdson, R. C. R., *The Grange, Delamere, Northwich, Cheshire.*

1919 ‡ Cumming, B. D., *Whistman's Wood, West Clandon, Surrey.*

1927 Cunliffe, N., M.A., D.Sc., *The School of Rural Economy, University of Oxford.*

1908 ‡ Curtis, W. P., *Richmond Chambers, Bournemouth.*

1930 Daintree, A. C., *P.O. Box* 797, *Lourenço Marques, Portuguese East Africa.*

1929 ‡ Daltry, H. W., *Bar Hill, Madeley, nr. Crewe.*

1928 Dampf, Dr. A., Chief Government Entomologist, *Avenida Insurgentes,* 171, *Mexico, D.F., Mexico.*

1911 Davey, H. W., *Cobungua,* 19, *Moama-road, E. Malvern, Australia.*

1930 Davies, W. Maldwyn, Ph.D., B.Sc., *University College of N. Wales, Memorial Buildings, Bangor.*

1913 ‡ Davidson, James, D.Sc., F.L.S. (Council, 1922–4), *Waite Agricultural Research Institute, Glen Osmond, University of Adelaide, S. Australia.*

1903 Day, F. H., 26, *Currock-terrace, Carlisle.*

1898 Day, G. O., *Sahlatston, Duncan's Station, Vancouver Island, British Columbia.*

1923 Dean, J. Davy, *Heathwaite, Heath Park-avenue, Cardiff.*

1930 Deshpande, V. G., M.Ag., *College of Agriculture, Poona, India.*

1923 Dewar, D. A., M.B., C.M., *Altyre House, Stanley, S.O., Co. Durham.*

1930 Dibb, J. R., 45, *King George Avenue, Chapel Allerton, Leeds.*

1917 ‡ Dicksee, Arthur, 24, *Lyford-road, Wandsworth Common,* S.W. 18.

1929 ‡ Dinnage, H., *Stable Cottages, Lower Beeding, Horsham.*

1887 ‡ Dixey, Frederick Augustus, M.A., M.D., F.R.S., Hon. Fellow of Wadham College (Pres., 1909–10; V.-Pres., 1904–5, 1911; Council, 1895, 1904–6), *Wadham College, Oxford.*

1921 Dobson, H. W., 14, *Finkle-street, Kendal.*

1909 † Dobson, Thomas, 33, *The Park, Sharples, Bolton.*

1912 ‡ Doig, Major K. A. C., R.A.M.C., M.R.C.S., L.R.C.P., *Karundas Estate, P.O. Nyeri, Kenya Colony.*

1891 ‡ Donisthorpe, Horace St. John K., F.Z.S. (V.-Pres., 1911; Council, 1899–1901, 1910–12), *Durandesthorpe,* 19, *Hazlewell-road, Putney,* S.W. 15.

1913 ‡ Dow, Walter James, *Penang, Guildford-road, Gt. Bookham.*
1910 Downes-Shaw, Rev. Archibald,
1924 ‡ Druitt, Alan, *Willow Lodge, Christchurch, Hants.*
1921 du Porte, E. M., *Macdonald College, Quebec, Canada.*
1913 Duffield, C. A. W., *Pickersden, Brook Ashford, Kent.*
1906 ‡ Dukinfield Jones, E., *Box* 1831, *Mountain-street, Glendale, California, U.S.A.*
1924 Dutt, A., B.A., B.Sc., *Asst. Entomologist, Rustam, Dept. of Agriculture, Baghdad* (*Iraq*).

1910 ‡ Eales-White, Maj. J. C., F.Z.S., 88, *Mount Ararat-road, Richmond, Surrey.*
1912 ‡ Earl, Herbert L., M.A., *Vanessa, Rawlyn-road, Torquay.*
1927 ‡ Earle, E., *Goodrest, Hambrook, Chichester.*
1924 Eastham, L., M.Sc., *Zoological Laboratory, The Museums, Cambridge.*
1890–1914, 1922 :
Eastwood, John E., *Middleham, Ringmer, Lewes, Sussex.*
1902 ‡ Edelsten, H. M. (V.-Pres., 1928; Council, 1926–28), *Hillside, Lindfield, Sussex.*
1927 Edmonds, T. H., *Strathmore, Totnes, Devon.*
1911 ‡ Edwards, F. W., M.A., Sc.D. (Council, 1929–31), 56, *Norton-road, Letchworth.*
1884 ‡ Edwards, Stanley, F.L.S., F.Z.S. (Council, 1912–14), 15, *St. Germans-place, Blackheath,* S.E. 3.
1913 Edwards, W. H., *Belle Vue, Barline, Beer, Devon.*
1924 ‡ Edwards, W. H., *Dept. of Agriculture, Kingston, Jamaica.*
1916 ‡ Efflatoun Bey, Prof. H., 20–22, *Rustum Pacha-street, Helouan, Egypt.*
1927 Ellaston-Wright, F. R., M.D., *Braunton, N. Devon.*
1900 ‡ Elliott, E. A., 41, *Chapel Park-road, St. Leonards-on-Sea.*
1924 Ellis, E. T., F.R.H.S., *Westwood, Ecclesall, Sheffield.*
1900 ‡ Ellis, H. Willoughby, F.Z.S., V.-Pres. (V.-Pres., 1924; Council, 1916–18, 1922–24, 1929–31), *Speldhurst Close, Sevenoaks, Kent,* and *Junior Carlton Club, Pall Mall,* S.W. 1.
1919 Elston, Albert H., "*Llandyssill,*" *Aldgate, South Australia.*
1925 Elton, C. S., B.A., *Dept. of Comparative Anatomy, University Museum, Oxford.*
1903 ‡ Eltringham, Harry, M.A., D.Sc., F.R.S., F.Z.S., President (Secretary, 1922–25; V.-Pres., 1914, 1918, 1926; Council, 1913–15, 1918–20, 1926–28, 1930), *Woodhouse, Stroud, Gloucestershire.*
1927 ‡ Embry, B., *St. Bartholomew's Vicarage, Dover.*
1927 Esaki, T., *College of Agriculture, Kyushu Imperial University, Fukuoka, Japan.*
1908 Eustace, E. M., M.A., *Wellington College, Berks.*
1930 Evans, Miss Alwen M., D.Sc., 33, *Greenhill Avenue, Mossley Hill, Liverpool.*
1926 Evans, Col. G. H., C.I.E., C.B.E., *c/o National Bank of India, Ltd.,* 26, *Bishopsgate,* E.C. 2.
1922 ‡ Evans, H. Silvester, M.R.C.S., L.R.C.P., *c/o Medical Dept., Suva, Fiji.*
1928 ‡ Evans, J. W., *Council of Scientific & Industrial Research, P.O. Box* 109, *Canberra City, F.C.T., Australia.*
1919 ‡ Evans, Brigadier, W. H., C.I.E., D.S.O., *c/o Mrs. Crisford, Commonwealth Bank of Australia, Old Jewry,* E.C. 2.

1919 ‡ Falconer, William, 25, *Ashdale-road, Waterloo, Liverpool.*
1927 Falkner, H. J., *Gyfu, Barton, Torquay.*
1924 ‡ Farmiloe, H. J. C., *Purley Park, nr. Reading, Berks.*
1925 ‡ Fassnidge, W., 47, *Tennyson-road, Southampton.*
*1926 Faz, Alfredo, *Calle Teatinos*, 384, *Santiago, Chili.*
1918 ‡ Ferguson, A., 433, *Kilmarnock-road, Newlands, Glasgow.*
1922 Fernald, H. T., Ph.D., 707, *E. Concord-av., Orlando, Florida, U.S.A.*
1930 Fletcher, P. Bainbrigge, 65, *Compton-road, Wimbledon*, S.W.
1898 ‡ Fletcher, Fleet Paymaster Thomas B., R.N., F.L.S., F.Z.S., *c/o P. Bainbrigge Fletcher*, 65, *Compton-road, Wimbledon*, S.W.
1883 † Fletcher, William Holland B., M.A., *Aldwick Manor, Bognor.*
1905 Floersheim, Cecil, 16, *Kensington Court Mansions*, S.W.8.
1922 Flower, Miss A. B., "*Langtrees,*" *Landford, nr. Salisbury.*
1928 ‡ Forbes, Comm. Wyndham, D.S.O., R.N., *Naval and Military Club*, 94, *Piccadilly*, W.1.
1924 ‡ Ford, E. B., M.A., B.Sc., *Dept. of Zoology and Comparative Anatomy, University Museum, Oxford.*
1913 Foster, Arthur H., M.R.C.S., L.R.C.P.(Eng.), M.B.O.U., 13, *Tilehouse-street, Hitchin, Herts.*
1898 ‡ Fountaine, Miss Margaret E.,
1920 ‡ Fox-Wilson, G., *Entomological Dept., R.H.S. Laboratory, Wisley, Ripley, Surrey.*
1928 Francis, H. O., 5, *East Barnet-road, New Barnet, Herts.*
1908 Fraser, F. C., Lt.-Col., M.D., I.M.S., *c/o Bombay Natural History Society*, 6, *Apollo-street, Bombay, India.*
1888 ‡ Fremlin, H. Stuart, M.R.C.S., L.R.C.P., *Govt. Lymph Establishment, Colindale-avenue, The Hyde*, N.W. 9.
1910 ‡ Frisby, G. E., 29, *Darnley-road, Gravesend.*
1907 ‡ Fryer, J. C. F., M.A. (V.-Pres., 1927, Council, 1916–18, 1925–27), *Milton-road, Harpenden, Herts.*

1930 ‡ Gabriel, A. G., *Wilfadene, Kings End, Ruislip, Middx.*
1887 ‡ Gahan, Charles Joseph, M.A., D.Sc. (Pres., 1917–18; V.-Pres., 1916, 1919; Sec., 1899–1900; Council, 1893–95, 1901, 1914–16, 1919), *The Mount, Aylsham, Norfolk.*
1920 Gardner, J. C. M., *Forest Research Institute, Dehra Dun, U.P., India.*
1901 †‡ Gardner, Willoughby, D.Sc., F.L.S., F.S.A., *Y Berlfa, Deganwy, N. Wales.*
1923 Garrett, F. C., O.B.E., D.Sc., *West Croft, Hexham.*
1931 ‡ Garthside, Stanley, *Farnham House Laboratory, Farnham Royal, Bucks.*
1922 ‡ Gater, B. A. R., M.A., D.I.C., F.R.M.S., Professor of Biology, *King Edward VII College of Medicine, Singapore, Straits Settlements.*
1920 Gauntlett, Dr. H. Leon, A.K.C., F.Z.S., 37, *Howard's-lane, Putney*, S.W. 15.
1919 ‡ Gedye, A. F. J., *P.O. Box* 216, *Nairobi, Kenya Colony.*
1923 Gee, G. F., *Abbotsford, Cuddington, nr. Northwich, Cheshire.*
1922 ‡ Ghosh, C. C., B.A., *Agricultural College, Mandalay, Burma, India.*
1930 Gibbins, E. G., *Box* 5, *Kampala, Uganda.*
1915 ‡ Gibson, Arthur, *Dominion Entomologist, Dept. of Agriculture, Ottawa, Canada.*
1925 Gilles, W. S., F.I.C., F.C.S., *The Cottage, Bocking, Braintree, Essex.*

1904 ‡ Gilliat, Francis T., B.A., 25, *Manor-road, Folkestone.*

1919 ‡ Gimingham, C. T., O.B.E., F.I.C., *Ministry of Agriculture, Pathological Laboratory, Milton-road, Harpenden, Herts.*

1930 ‡ Glegg, D. Lindsay, 9, *Westleigh Avenue, Putney Hill,* S.W. 15.

1914 ‡ Godfrey, E. J., 1902, *Hicks'-lane, Bangkok, Siam.*

1924 Golding, F. D., *Moor Plantation, Ibadan, S. Provinces, Nigeria.*

1920 ‡ Goodban, B. S., *Watersmeet, West-street, Ewell, Epsom, Surrey.*

1927 ‡ Goodman, A. de B., *Normanby, Potters Bar, Middx.*

1904 Goodwin, Edward, *Canon Court, Wateringbury, Kent.*

1925 ‡ Gordon, D. J., B.A., *Craigellachie House, Strathpeffer, N.B.*

1898 ‡ Gordon, J. G. McH., *Corsemalzie, Whauphill S.O., Wigtownshire.*

1929 Graham-Smith, G. S., M.D., F.R.S., *Dept. of Pathology, Tennis Court-road, Cambridge.*

1927 Grandi, Prof. Dr. Guido, *R. Instituto Superiore Agrario, Bologna, Italy.*

1924 Grant, J. H., *Cole Dale View, Coleshill-road, Ward End, Birmingham.*

1931 ‡ Grant, Mrs. Katherine J.

1914 Gravely, F. H., *Museum House, Egmore, Madras.*

1911 ‡ Graves, P. P., 5, *Hereford-square,* S.W. 7.

1891†‡Green, E. Ernest, F.Z.S. (Pres., 1923–24; V.-Pres., 1915, 1925; Council, 1914–16, 1925), *Way's End, Beech-avenue, Camberley.*

1893 † Greenwood, H. P., F.L.S., *Whitsbury House, Salisbury.*

1921 Greenwood, W. F. N., *C.S.R. Co., Lautoka, Fiji.*

1928 ‡ Grensted, The Rev. Canon L. W., M.A., B.D., *Oriel College, Oxford.*

1926 ‡ Grey, Mrs. O., 90, *Charing Cross-road,* W.C. 2.

1894 ‡ Grimshaw, Percy H., *Royal Scottish Museum, Edinburgh.*

1905 Grist, Charles J., *The Croft, Carol Green, Berkswell, Coventry.*

1920 ‡ Grosvenor, T. H. L., *Springvale, Linkfield-lane, Redhill, Surrey.*

1927 Gunder, J. D., 310, *Linda Vista Avenue, Pasadena, California, U.S.A.*

1920 ‡ Gunton, Major H. C., *Rathgar, Milton-av., Gerrard's Cross, Bucks.*

1906 Gurney, Gerard H., *Keswick Hall, Norwich.*

1910 Gurney, William B., Govt. Entomologist, *Department of Agriculture, Sydney, Australia.*

1912 Hacker, Henry, *Queensland Museum, Brisbane, Queensland.*

1919 Hadwen, Dr. Seymour, D.Vet.Sci., 579, *Huron-street, Toronto, Canada.*

1925 ‡ Haig-Thomas, P., *The Grange, Goring-on-Thames.*

1906 ‡ Hall, Arthur, 29*a*, *Dingwall-road, Croydon, Surrey.*

1885 ‡ Hall, T. W., *Wood Grange, Shire-lane, Chorley Wood, Herts.*

1921 ‡ Hall, W. J., D.Sc., Director, *The B.S.A. Co.'s Citrus Experimental Station, Mazoe, S. Rhodesia.*

1912 ‡ Hallett, H. M., 64, *Westbourne-road, Penarth, Glamorganshire.*

1923 ‡ Halliwell, A. C., F.R.C.S., 1, *Cæsarea-place, Jersey, C.I.*

1929 Hamlin, W. E., 3, *St. Mark's-place, Wimbledon,* S.W. 19.

1915 Hamm, Albert Harry, A.L.S., 22, *Southfield-road, Oxford.*

1928 ‡ Hammond, C. O., 56, *Boreham-road, Lordship-lane, Wood Green,* N. 22.

1891 ‡ Hanbury, Frederick J., F.L.S., *Brockhurst, E. Grinstead.*

1923 ‡ Hancock, G. L. R., *Dept. of Agriculture, Box* 5, *Kampala, Uganda ; Trans. to :—c/o Archdeacon Hancock, The Rectory, Whatley, Frome, Soms.*

1923 Handley, G., 54, *All Saints'-road, Kings Heath, Birmingham.*
1929 ‡ Hanson, H. S., *Farnham House Laboratory, Farnham Royal, Bucks.*
1930 Hardwicke, S. M. B., *Friarmayne, Nr. Dorchester.*
1903 ‡ Hare, E. J., 4, *New-square, Lincoln's Inn,* W.C. 2.
1920 ‡ Hargreaves, E., *Lands and Forest Dept., Freetown, Sierra Leone.*
1920 Hargreaves, H., *Govt. Entomologist, Dept. of Agriculture, Kampala, Uganda.*
1926 Harmsworth, Sir H. A. B.
1926 Harris, R. H. T. P., Director, *Tsetse Fly Control Operations, P.O. Box* 41, *Empangeni, Zululand, S. Africa.*
1928 Harris, W. V., Asst. Entomologist, *Dept. of Agriculture, Morogoro, Tanganyika Territory.*
1925 Harukawa, C., *Ohara Institute, Kurashiki, Okayama-Ken, Japan.*
1910 ‡ Harwood, Philip, *c/o Westminster Bank, Ltd.,* 92, *Wimborne-road, Winton, Bournemouth.*
1926 Hatch, Melville H., *Dept. of Zoology, University of Washington, Seattle, Washington, U.S.A.*
1919 ‡ Hawker-Smith, W., *Benares, Wormley, Godalming, Surrey.*
1927 ‡ Hawkins, C. N., 23, *Dalebury-road, Upper Tooting,* S.W. 17.
1913†‡Hawkshaw, Oliver, *Holly Combe, Liphook, Hants.*
1924 Hayward, A. R., *Misterton, Somerset.*
1919 ‡ Hayward, H. C., M.A., *Repton, Derby.*
1921 ‡ Hayward, Capt. K. J., F.R.G.S., *c/o Breyer Hmnos, Florida* 414, *Buenos Aires, Argentine.*
1929 Hebbert, G. K. P., *Lee Copse, Berrynarbor, N. Devon.*
1910 ‡ Hedges, Alfred V., *Milton House, Milton Ernest, Beds.*
1919 ‡ Hemming, Capt. A. F., C.B.E., F.Z.S., Treasurer (1929- ; Council, 1928), 29, *West Cromwell-road,* S.W. 5.
1910 Henderson, J., *Ashford House, Talybont-on-Usk, Breconshire.*
1918 Herrod-Hempsall, J., *Sternthorpe, Stockingstone-road, Old Bedford-road, Luton, Beds.*
1903 Herrod-Hempsall, W., *W.B.C., Apiary, Old Bedford-road, Luton, Beds.*
1929 ‡ Heslop, Ian R. P., B.A., 34, *Henleaze Gardens, Westbury-on-Trym. Bristol.*
1925 Hesse, Dr. A. T., *South African Museum, Cape Town, S. Africa.*
1913 Hewitt, John, B.A., Director, *Albany Museum, Grahamstown, S. Africa.*
1923 ‡ Hicks, J. B., 30, *Stanhope Gardens,* S.W. 7.
1922 ‡ Higgins, L. G., M.A., F.R.C.S., *Linkwood, Woking, Surrey.*
1930 Hincks, W. D., 9, *Grange Avenue, Chapeltown, Leeds.*
1924 ‡ Hingston, Major R. W. G., M.C., 17, *Bolton-road, Grove Park, Chiswick,* W. 4.
1929 ‡ Hobby, B. M., B.A., 21, *Methuen-street, Southampton.*
1912 Hodge, Harold, 99, *Highbury-place,* N. 5.
1922 Hogarth, A. Moore, 143, *Golders Green-road,* N.W. 11.
1925 Holdaway, F. G., Ph.D., *Division of Entomology, Council for Scientific and Industrial Research, Canberra City, F.C.T., Australia.*
1910 Holford, H. O., *Elstead Lodge, Godalming, Surrey.*
1887 Holland, The Rev. W. J., D.D., Ph.D., Director Emeritus, *Carnegie Museum, Pittsburgh, Penn., U.S.A.*
1898 ‡ Holman-Hunt, C. B., *The Laurels, Walditch, Nr. Bridport, Dorset.*
1929 ‡ Hood, Lt.-Col., the Viscount, 61, *Porchester-terrace,* W. 2.

1922 ‡ Hopkins, G. H. E., *Box 41, Kampala, Uganda.*
1921 Hopper, L. B.
1919 de Horrack-Fournier, Mme., 90, *Boulevard Malesherbes, Paris,* and *Château de Voisins, Louveciennes, Seine-et-Oise, France.*
1928 Hosny, M., Entomological Secretary, *Ministry of Agriculture, Cairo, Egypt.*
1927 ‡ Hucklesby, F. G., *c/o Mrs. Allman, Oak Tree Cottage, Forest Green, Ockley, Surrey.*
1888 Hudson, G. V., *Hill View, Karori, Wellington, New Zealand.*
1907 Hughes, C. N., 78, *Harley House,* N.W. 1.
1929 Hughes, Miss Winifred P. K., Division of Economic Entomology, C.C.S.I.R., *Canberra City, F.C.T., Australia.*
1921 Hunt, The Rev. J. Wesley, *Wesleyan Methodist Church of S. Africa, Private Bag, P.O. Imvani, C.P., S. Africa.*
1917 Hunter, David, M.A., M.B., *The Coppice, Nottingham.*
1922 ‡ Hutchinson, G. E., *Osborn Zoological Laboratory, Yale University, New Haven, Conn., U.S.A.*
1923 Hutchinson, J. H., M.A., *Holly House, Littlebourne, nr. Canterbury.*

1912 † ‡ Imms, A. D., Sc.D., M.A., F.R.S., F.L.S. (V.-Pres., 1920, 1930; Council, 1919–21, 1930–), *Zoological Laboratory, The Museums, Cambridge.*
1920 Inglis, C. M., F.Z.S., M.B.O.U., *The Museum House, Darjeeling, Bengal, India.*
1931 Issiki, Prof. Syûti T., *School of Agriculture, Taihoku University, Formosa, Japan.*

1927 ‡ Jackson, C. H. N., *Cayton, York-road, St. Albans.*
1917 ‡ Jackson, Miss Dorothy J., *North Cliff, St. Andrews, Fife.*
1927 Jacobi, Prof. A., *Museum für Tierkunde und Volkerkunde, Dresden, Germany.*
1930 James, H. C., Ph.D., *Scott Agricultural Laboratories, P.O. Box 323, Nairobi, Kenya Colony.*
1920 James, Russell.
1914 ‡ Janse, Prof. A. J. T., D.Sc., 1*st-street, Gezina, Pretoria, S. Africa.*
1898 ‡ Janson, Oliver J., 13, *Fairfax-road, Hornsey,* N. 8.
1927 Janson, W. H., 44, *Gt. Russell-street, Bloomsbury,* W.C. 1.
1928 ‡ Jeddere-Fisher, Major H. C., *Woodlands Corner, Littlehampton, Sussex.*
1909 Jepson, Frank P., M.A., *Dept. of Agriculture, Peradeniya, Ceylon.*
1924 ‡ Johnston, H. B., M.A., 5, *Scroope Terrace, Cambridge, late Wellcome Laboratory, Khartoum, Sudan.*
1920 ‡ Johnstone, Douglas.
1927 Johnstone, J. F., *Ruxley Lodge, Claygate, Surrey.*
1908 ‡ Joicey, J. J., F.L.S., F.Z.S., F.R.G.S. (Council, 1921–3), *The Hill Museum, Witley, Surrey.*
1930 ‡ Jones, E. Parry, B.Sc., 62, *Meath-road, Maerieg, Glamorgan.*
1924 Jones, F. M., 2000, *Riverview Avenue, Wilmington, Delaware, U.S.A.*
1929 Jones, H. P., *Natural History Museum, Wollaton Hall, Nottingham.*
1925 ‡ Jones, J. R. J. Ll., M.A., *Arranmore, Mill Bay, Cobble Hill, British Columbia.*

1894†‡Jordan, K., Ph.D., V.-Pres. (President, 1929–30; V.-Pres., 1909, 1926; Council, 1909–11, 1924–26, 1931), *The Museum, Tring.*
1910 ‡ Joseph, E. G., 23, *Clanricarde-gardens*, W. 2.
1910 ‡ Joy, E. C., *Moore's Hotel, The Leas, Folkestone.*
1912 ‡ Joy, Norman H., M.R.C.S., L.R.C.P., 78, *Crescent-road, Reading.*

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1896†‡Kaye, W. J. (Council, 1906–8), *Caracas, Ditton Hill, Surbiton.*
1925 Kearns, H. G. H., B.Sc., *Dept. of Zoology, The University, Bristol.*
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1926 Kennedy, Prof. C. H., *Ohio State University, Columbus, Ohio, U.S.A.*
1890 ‡ Kenrick, Sir George H., *Whetstone, Somerset-road, Edgbaston, Birmingham.*
1929 Kenway, H. C., 179, *Brook-street, Brooklyn, Pretoria, S. Africa.*
1931 Kerr, Prof. J. Graham, *The University, Glasgow.*
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1906 Keynes, John Neville, M.A., D.Sc., 6, *Harvey-road, Cambridge.*
1900 Keys, James H., 7, *Whimple-street, Plymouth.*
1925 Killington, F. J., A.C.P., 22 *Litchfield-road, Midanbury, Bitterne-park, Southampton.*
1889 ‡ King, James J. F.-X., 26, *Ruthven-street, Kelvinside, Glasgow*, W. 2.
1912 ‡ King, H. H., Government Entomologist, *Wellcome Tropical Research Laboratories, Khartoum, Sudan.*
1917 ‡ Kirkpatrick, T. W., *E. African Agric. Res. Station, Amani, via Tanga, Tanganyika.*
1887 † Klein, Sydney T., F.L.S., F.R.A.S., *Lilly's, Chelsfield, Kent.*

1927 ‡ Labouchere, Col. F. A., 15, *Draycott-avenue, Chelsea*, S.W.
1922 ‡ Lacey, Lionel, 529, *Stellar-avenue, Pelham Manor, N.Y., U.S.A.*
1929 Ladell, W. R. S., *Dept. of Agriculture, Bangkok, Siam.*
1925 Laidlaw, F. F., M.R.C.S., L.R.C.P., *Eastfield, Uffculme, Devon.*
1931 Laidlaw, W. B. R., 25, *Westburn-drive, Aberdeen.*
1916 ‡ Laing, Frederick (Council, 1922–24), *British Museum (Natural History), Cromwell-road*, S.W. 7.
1910 ‡ Lakin, C. Ernest, M.D., F.R.C.S., 105, *Harley-street*, W. 1.
1924 Lamb, C. G., M.A., Sc.D., 65, *Glisson-road, Cambridge.*
1911†‡Lamborn, W. A., M.R.C.S., L.R.C.P., *c/o W. S. Tomkinson, Esq., North Hinksey, Oxon.*
1917 Langham, Sir Charles, Bart., *Tempo Manor, Co. Fermanagh.*
1922 ‡ Lankester, C. H., *Cartago, Costa Rica.*
1920 ‡ Lathy, Percy I., 90, *Boulevard Malesherbes, Paris.*
1916 Latta, Prof. Robert, D.Ph., *c/o The Librarian, University Library, Glasgow.*
1925 Latter, M. P., F.G.S., *Box* 1169, *The Corner House, Johannesburg, S. Africa.*
1895 Latter, Oswald H., M.A., *The Elms, Charterhouse-road, Godalming.*
1927 ‡ Lawson, H. B., *Brock Hill, Horsell, Woking, Surrey.*
1930 Lawson, J. A., *Greenacre, Forest Row, Sussex.*
1899 Lea, Arthur M., Government Entomologist, *Museum, Adelaide, S. Australia.*
1923 ‡ Lean, O. B., *The Moor Plantation, Ibadan, Nigeria, W. Africa.*
1930 ‡ Leeson, H. S., 102, *Mansell-road, Greenford, Middx.*

1910 Leigh, H. S., *Brentwood, Worsley, Manchester.*
1927 Leivers, A. R., 20, *Warwick-road, Mapperley-park, Nottingham.*
1920 ‡ Leman, G. C., *Wynyard*, 152, *West Hill, Putney Heath*, S.W. 15.
1924 ‡ Le Pelley, R. H., Ph.D., *c/o Director of Agriculture, Nairobi, Kenya.*
1930 ‡ Lever, R. J. A. W., *Tulagi, British Solomon Islands, via Australia.*
1903†‡Levett, The Rev. Thomas Prinsep, *Frenchgate, Richmond, Yorks.*
1925 Levick, J., *Ashley House, Handsworth Wood, Birmingham.*
1931 ‡ Lewis, David J., *Trinity College, Cambridge.*
1908 † Lewis, John Spedan, F.Z.S., 54, *Orchard Court, Portman-square*, S.W.1.
1922 ‡ Light, S. S., *Rockwood Estate, P.O. Nellakota, Nilgiris, S. India.*
1930 Lisney, A. A., B.A., *Cremorne, Shankill, Co. Dublin, Irish Free State.*
1919 ‡ Lloyd, Llewellyn, D.Sc., *Zoological Dept., University, Leeds.*
1885†‡Lloyd, R. W. (V.-Pres., 1924, 1928; Council, 1900–1, 1923–5, 1928–30), 1, 5 *and* 6, *Albany, Piccadilly*, W. 1.
1920 ‡ Lodge, George, *Hawkhouse, Upper Park-road, Camberley.*
1903 Lofthouse, T. A., *The Croft, Linthorpe, Middlesbrough.*
1925 ‡ Longfield, Miss C., 20, *Pont-street*, S.W. 1.
1908 ‡ Longsdon, D., *The Flower House, Southend, Catford*, S.E. 6.
1930 Lowe, J. H. B., R.E., 69, *Oakwood Court*, W. 14.
1923 Lowther, R. C., M.B., Ch.B., *Fernleigh, Grange-over-Sands, Lancs.*
1898 ‡ Lucas, William John, B.A. (Council, 1904–6), 28, *Knight's-park, Kingston-on-Thames.*
1929 ‡ Lyall, Miss Edith M., B.Sc., *The Withies, Steel's-lane, Oxshott, Surrey.*
1903 Lyell, G., *Gisborne, Victoria, Australia.*

1910 ‡ MacDougall, R. Stewart, M.A., D.Sc., F.R.S.E. (V.-Pres., 1929; Council, 1928–30), *Ivy Lodge, Gullane, East Lothian.*
1922 ‡ Mace, Herbert, *Faircotes, Harlow, Essex.*
1930 McHardy, J. W., B.Sc., *The Laboratory, Dar-es-Salaam, Tanganyika.*
1928 ‡ McKenny-Hughes, A. W., 22, *Stanford-road, Kensington*, W. 8
1929 ‡ MacLagan, D. Stewart, B.Sc., *c/o Dept. General Physiology, Harvard University, Cambridge, Mass., U.S.A.*
1919 McLeod, M. C.
1930 Madwar, S., M.B., Ch.B., D.T.M. & H., *Molteno Institute, Cambridge.*
1899†‡Main, Hugh, B.Sc., F.Z.S. (Council, 1908–10), 55, *Buckingham-road, South Woodford*, E. 18.
1930 ‡ Mansbridge, G. H., *Gonville, Mina-avenue, Langley-road, Slough.*
1892 ‡ Mansbridge, W., *Monrieth, Derby-road, Formby, Liverpool.*
1919 Mansfield-Aders, Dr. W., M.B.E.
1926 ‡ Mansour, K., *Dept. of Zoology, The Egyptian University, Abbassiah, Cairo.*
1925 ‡ Marks, E.
1920 Marriner, T. F., *Church House, Court-square, Carlisle.*
1895 ‡ Marshall, Sir Guy A. K., C.M.G., D.Sc., F.R.S., F.Z.S. (V.-Pres., 1919, 1924; Council, 1907–8, 1919–21, 1924–6, 1928–30), 48, *Pont-street*, S.W. 1.
1922 Marshall, J. F., M.A., F.Z.S., *Seacourt, Hayling Island, Hants.*
1896 Marshall, P., M.A., B.Sc., F.G.S., *Hautere, Bellevue-road, Lower Hutt, New Zealand.*
1897 Martineau, Alfred H., *Shutteroaks Toll House, Crewkerne, Somerset.*

1919 Marumo, N., *Zoological Institute, Agricultural College, Imperial University, Komaba, Tokyo, Japan.*
1922 ‡ Massee, A. M., *East Malling Research Station, East Malling, Kent.*
1895 Massey, Herbert, *Ivy-Lea, Burnage, Didsbury, Manchester.*
1921 Matsumura, Prof. S., *Hokkaido Imperial University, Sapporo, Japan.*
1887 Matthews, Coryndon.
1912 Maulik, Prof. S., *c/o R. Maulik, Clock Tower, Hogg Market, Calcutta, India.*
1916 ‡ May, Harry Haden, *Black Friars Distillery, Southside-street, Plymouth.*
1929 ‡ de Meillon, Botha, *South African Institute for Medical Research, Box* 1038, *Johannesburg, S. Africa.*
1927 Mellor, J. E. M., M.A., *Cambridge Univ. Horticultural Research Station, School of Agriculture, Cambridge.*
1919 ‡ Mellows, Charles, M.A., *The College, Bishops Stortford.*
1912 ‡ Metcalfe, The Rev. J. W., *Holmbank, Westcott, Surrey.*
1880 ‡ Meyrick, Edward, B.A., F.R.S., F.Z.S., *Thornhanger, Marlborough.*
1926 ‡ Michelmore, A. P. G., *Gezira Research Farm, Wad Medani, Sudan.*
1920 ‡ Miller, D., Chief of Dept. of Entomology, *The Cawthron Institute, Nelson, New Zealand.*
1921 Miller, N. C. E., *Dept. of Agriculture, Kuala Lumpur, F.M.S.*
1930 Misra, Dr. A. B.
1926 ‡ Mistihawy, A. M. el., *Plant Protection Service, Giza, Egypt.*
1923 Mitchell-Hedges, F. A., *The Deene, Lamorna, nr. Penzance, Cornwall.*
1902 ‡ Montgomery, A. M., 36, *Twyford-avenue, Acton,* W. 3.
1922 ‡ Moore, A., M.D., *Sundew, Lyndhurst, Hants.*
1899 ‡ Moore, Harry, 12, *Lower-road, Rotherhithe,* S.E. 16.
1927 Moore, H. W. B., *Plan Albion, Berbice, British Guiana.*
1922 Moore, J. W., 151, *Middleton Hall-road, King's Norton, Birmingham.*
1927 Morgan, Capt. H. O., 12, *All Saints-road, Clifton, Bristol.*
1923 ‡ Morison, G. D., B.Sc., Ph.D., *Entomological Dept., Marischal College, Aberdeen.*
1895 †‡ Morley, Claude, F.Z.S., *Monk Soham House, Suffolk.*
1920 ‡ Morris, H. M., M.Sc., *Agricultural Dept., Nicosia, Cyprus.*
1893 Morton, Kenneth J., 13, *Blackford-road, Edinburgh.*
1910 ‡ Mosely, Martin E., 43, *Lansdowne-crescent,* W. 11.
1911 ‡ Moss, The Rev. A. Miles, *c/o Messrs. Booth & Co., Para, Brazil.*
1911 Mounsey, J. Jackson, *Bryn-Tirion, Kingstone, Hereford.*
1931 Moutia, L. A., *Asst. Entomologist, Dept. of Agriculture, Reduit, Mauritius.*
1922 ‡ Moysey, Maj. F., *c/o Col. R. H. Rattray, Halliford House, Lonsdale-road, Newton Abbot, Devon.*
*1901 † Muir, Frederick (V.-Pres., 1930; Council, 1930–31), *Manoa, Durfold Hill, Warnham, Sussex.*
1912 † Mullan, Jal P., M.A., F.L.S., F.Z.S., Professor of Biology, *St. Xavier's College, Lamington-road, Grant-road Post, Bombay, India.*
1925 Mumford, E. P., *Faculty Club, University Campus, Berkeley, Cal., U.S.A.*
1920 Munro, H. K., B.Sc., *P.O. Box* 513, *Pretoria, South Africa.*
1918 Munro, J. W., D.Sc. (Council, 1927-9), *Imperial College of Science, S. Kensington,* S.W. 7.
1914 ‡ Murray, G. H., *Director of Agriculture, Rabaul, New Britain, Territory of New Guinea, via Australia.*

1922 Musgrave, A., *Australian Museum, Sydney, N.S.W.*
1920 ‡ Myers, J. G., D.Sc., *Mount St. Benedict, Tuna-Tuna, Trinidad, West Indies.*

1921 Nair, K. P. U., *Training College, Trivandrum, India.*
1926 ‡ Nash, T. A. M., *c/o Dept. Tsetse Research, Kikori, Kondoa, via Dodoma, Tanganyika Territory.*
1903 ‡ Neave, S. A., M.A., D.Sc., F.Z.S., V.-Pres., Secretary, (Secretary, 1919- ; V.-Pres., 1918; Council, 1916–18), 41, *Queen's-gate*, S.W. 7, and *Bishop's House, Beaconsfield, Bucks.*
1919 ‡ Nell, Louis, *Imperial Institute of Entomology*, 41, *Queen's-gate*, S.W. 7.
1919 Nelson, W. G. F. (Council, 1922–4), 64, *Lincoln's Inn Fields*, W.C. 2.
1923 Nevill, T. N. C., 48, *Sloane-square*, S.W.
1931 Newbold, W., O.B.E., M.A., *Imberley Lodge, East Grinstead, Sussex.*
1926 Newey, H. F., *Craigmore, Coleshill-street, Sutton Coldfield.*
1923 ‡ Newland, Gordon, 1, *Albemarle-street, Piccadilly*, W. 1.
1907 ‡ Newman, Leonard Woods, *Bexley, Kent.*
1913 Newman, L. J. W., 5, *Bernard-street, Claremont, W. Australia.*
1909 Newstead, Alfred, *The Grosvenor Museum, Chester.*
1921 Nicholson, A. J., *University of Sydney, New South Wales, Australia.*
1914 ‡ Nicholson, Charles, *Nansgwithick, Tresillian, Probus, Cornwall.*
1909 ‡ Nicholson, G. W., M.A., M.D. (Council, 1913–15), *Oxford and Cambridge Club, Pall Mall*, S.W. 1.
*1929 ‡ Norris, H. E., 15, *Market-place, Cirencester, Glos.*
1923 Notman, H., F.S.A., *Y-Lightning Ranch, Hereford, Arizona, U.S.A.*
1895 Nurse, Lt.-Col. C. G., *Redcote, Rusthall Park, Tunbridge Wells.*

1910 ‡ Oldaker, Francis A., M.A., *The Red House, Haslemere.*
1931 Oliver, W. R. B., Director, *Dominion Museum, Wellington, N.Z.*
1921 Ollenbach, O. C., *Survey of India Dept., Dehra Dun, India.*
1925 Onslow, F. R. D., B.A., F.Z.S., *Effingham House, Little Common, Bexhill-on-Sea.*
1913 ‡ Ormiston, Walter, *New Oriental Hotel, Galle, Ceylon.*

1895 ‡ Page, Herbert E. (Council, 1918–20), *Bertrose, Gellatly-road, St. Catherine's Park*, S.E. 15.
1928 Paine, R. W., Assistant Entomologist, *Dept. of Agriculture, Suva, Fiji.*
1921 Pallis, M. A., *Tatoi*, 20, *Aigburth-drive, Liverpool.*
1916 Palmer, A. Ray, *Standeford, Baldock-road, Letchworth, Herts.*
1931 Palmer, K. L., *Meadowlea, Gobowen, Shropshire.*
1919 Paravicini, Louis, *Commissioner de la Bourse de Bâle, Bâle, Switzerland.*
1929 ‡ Parkes, W. Randall, *St. Thomas' Hospital*, S.E. 1.
1918 ‡ Parris, R. S., *Raymond House, Bramley, Guildford.*
1919 Patton, Prof. W. S., M.B., *School of Tropical Medicine, Pembroke-place, Liverpool.*
1922 ‡ Pearce, The Rev. E. J., 17, *Milton-road, Swindon, Wilts.*
1922 ‡ Pearce, Miss E. K., *East Morden, Wareham, Dorset.*
1927 ‡ Pearman, J. V., 32, *Cornwallis Crescent, Clifton, Bristol.*

1916 ‡ Peebles, Howard M., 14, *Northwick House, St. John's Wood-road,* N.W.8.
1919 Peed, John, *Aylsham, Norfolk.*
1921 ‡ Pendlebury, Capt. H. M., *Broadlands, Shrewsbury;* Systematic Entomologist, *Federated Malay States.*
1914 ‡ Pendlebury, Major Wm. J. de Monté, M.A., *Broadlands, Shrewsbury.*
1931 ‡ Pennington, K. M., *Michaelhouse, Balgowan, Natal, S. Africa.*
1928 ‡ Perkins, J. F., 4, *Thurlestone-road, Newton Abbot, Devon.*
1922 ‡ Perkins, M. G. L., 5, *Little Cloisters, Westminster-abbey,* S.W. 1.
1903 † Perkins, R. C. L., M.A., D.Sc., F.R.S., 4, *Thurlestone-road, Newton Abbot, Devon.*
1907 † Perrins, J. A. D., 3rd Seaforth Highlanders.
1897 ‡ Phillips, Capt. Hubert C., F.Z.S., M.R.C.S., L.S.A., 17, *Hereford-road, Bayswater,* W. 2.
1931 Phillips, Capt. J. S., M.C., B.A., *Experiment Station, H.A.P.C., University of Hawaii, Honolulu.*
1903†‡Phillips, Montagu A., F.R.G.S., F.Z.S., 57, *St. George's-square,* S.W. 1.
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1917 ‡ Pickard-Cambridge, Arthur W., M.A., D.Litt, *The Grange, Ecclesall, Sheffield.*
1929 Pickles, Alan, B.Sc., 16, *Cambridge-street, Clayton, Bradford.*
1928 Piel, O., *Musée Heude, Université l'Aurore, Shanghai, China.*
1891 ‡ Pierce, F. N., *The Old Rectory, Warmington, Oundle, Northants.*
1913 Platt, E. E., 403, *Essenwood-road, Durban, Natal.*
1919 Pomeroy, A. W. Jobbins.
1921 Ponniah, D., *Agricultural Dept., Kuala Lumpur, Fed. Malay States.*
1930 ‡ Potter, C., B.Sc., *Moxley House, Mount-road, Thundersley, Essex.*
1929 Potts, W. H., B.A., 7, *Ridge-road, Winchmore Hill,* N. 21.
1884†‡Poulton, Professor Edward B., D.Sc., M.A., F.R.S., F.L.S., F.G.S., F.Z.S., Hope Professor of Zoology in the University of Oxford (Pres., 1903–4, 1925–6; V.-Pres., 1894–5, 1902, 1905, 1922–3, 1927; Council, 1886–8, 1892, 1896, 1905–7, 1922–4, 1927, 1931–), *Wykeham House, Banbury-road, Oxford.*
1919 Praed, C. W. M., *Dalton Hill, Albury, Surrey.*
1922 Price, J., 165, *Corporation-street, Stafford.*
1908 ‡ Prideaux, R. M. (Council, 1917), *Woodlands, Brasted Chart, Sevenoaks.*
1920 ‡ Prior, W. H. T., *Culban, Main-road, New Eltham, Kent.*
1904 ‡ Priske, Richard A. R., 136, *Coldershaw-road, W. Ealing,* W. 13.
1920 Prout, Miss A. E., *Lane End, Hambledon, Godalming.*
1893 ‡ Prout, L. B. (Council, 1905–7), 84, *Albert-road, Dalston,* E. 8.
1910 Punnett, Professor R. C., M.A., *Caius College, Cambridge.*
1926 Puri, Dr. I. M., *Central Research Institute, Kasauli, Punjab, India.*

1922 ‡ Rae, Mrs. Margaret, *Courthill, Birkenhead.*
1923 ‡ Raff, Miss Janet W., M.Sc., *c/o The School of Agriculture, University of Melbourne, Victoria, Australia.*
1912 ‡ Rait-Smith, W. (Council, 1924–6; 1929–31), *Hurstleigh, Linkfield-lane, Redhill, Surrey.*
1924 ‡ Ralfs, Miss E. M., 60, *Clarendon-road, Holland-park,* W. 11.

1916 Ramachandra Rao, Y., M.A., *Agricultural College, Coimbatore, India.*
*1920 ‡ Rambousek, Dr. F. G., M.P., *Prague, Post Office*, 48, *Vorechovka* 112, *Czechoslovakia.*
1907 ‡ Rayward, A. L., 15, *Vicarage-drive, Eastbourne.*
1928 Reed, F. J., 30 and 32, *Eastover, Bridgwater, Somerset.*
1898 Reuter, Professor Enzio, *Helsingfors, Finland.*
1910 ‡ de Rhé-Philipe, G. W. V., *Birkheads, Reigate, Surrey.*
1927 ‡ Richards, Arthur J., *Rozeldene, Hindhead, Surrey.*
1924 ‡ Richards, O. W., M.A. (Council, 1931–), 30, *Mackenzie St., Slough, Bucks.*
1920 ‡ Richards, P. B., Government Entomologist, *Dept. of Agriculture, United Provinces, Allahabad, India.*
1920 ‡ Richardson, A. W., 28, *Avenue-road, Southall, Middlesex.*
1922 ‡ Richardson, Rev. W. H., 88, *Stone-road, Stafford.*
1921 Riddell, Miss J., 815, *El Centro-avenue, Los Angeles, California, U.S.A.*
1930 Ries, D. T., M.S., Ph.D., *Cranbrook Institute of Science, Bloomfield Hills, Michigan, U.S.A.*
1924 Riley, C. F. C., *Dept. of Zoology, University of Manitoba, Winnipeg, Canada.*
1912 ‡ Riley, N. D., F.Z.S. (V.-Pres., 1929; Secretary, 1926–9; Council, 1921–3, 1930), 5, *Brook Gardens, Beverley-road, Barnes*, S.W. 13, and *British Museum (Natural History), S. Kensington*, S.W. 7.
1908 ‡ Rippon, Claude, M.A., 28, *Springfield House, Abingdon.*
1926 ‡ Robbins, J. C., *The Rosery, Limpsfield, Surrey.*
1917 ‡ Roberts, A. W. Rymer, M.A., *Molteno Institute, Downing-street, Cambridge.*
1927 Roberts, J. E. H., O.B.E., M.B., F.R.C.S., 26, *Harley-street*, W. 1.
1930 Roberts, J. I., M.Sc., *The Medical Dept., Nairobi, Kenya Colony.*
1889–1898, 1925 :
‡ Robinson, A., B.A., *Bretanby, Seal, nr. Sevenoaks, Kent.*
1904 ‡ Robinson, Lady, *Kirklington Hall, Newark.*
1921 Roebuck, A., *Midland Agricultural College, Sutton Bonington, Loughborough.*
1908 ‡ Rogers, The Rev. Canon K. St. Aubyn, M.A., *Box* 818, *Nairobi, Kenya Colony.*
1922 Rosa, A. F., M.D., 4, *Bellevue-crescent, Edinburgh.*
1907 ‡ Rosenberg, W. F. H., 57, *Haverstock-hill*, N.W. 3.
1888†‡Rothschild, The Right Hon. Lord, D.Sc., F.R.S., F.L.S., F.Z.S. (President, 1921–2; V.-Pres., 1920, 1923; Council, 1900, 1919), *Zoological Museum, Tring.*
1930 Rothschild, Miss Miriam, 4, *Palace Green*, W. 8.
1890 ‡ Routledge, G. B., *Tarn Lodge, Heads Nook, Carlisle.*
1928 ‡ Russell, A. G. B., M.V.O., 88a, *Cromwell-road*, S.W. 7.
1922 Russell, Frank, *Auldham House, Worksop, Notts.*

1919 ‡ St. Aubyn, Capt. John G., 14, *Purley Knoll, Purley, Surrey.*
1920 St. John, W. St. A., M.R.C.S., L.R.C.P., *Derwent House, Derby.*
1928 ‡ Salt, G., Ph.D., D.Sc., *The Zoological Laboratory, Cambridge.*
1926 ‡ Samman, Miss M., *The Croft, North Ferriby, E. Yorks.*
1910 ‡ Saunders, H. A., 19, *Creffield-road, Colchester.*
1923 ‡ Saunders, L. G., M.Sc., Ph.D., *Dept. of Zoology, University of Saskatchewan, Saskatoon, Canada.*

1920 Scharff, Dr. J. W.

1901 Schaus, W., F.Z.S., *U.S. National Museum, Washington, D.C., U.S.A.*

1920 Schlupp, W. F., B.Sc., *P.O. Box* 182, *Newcomerstown, Ohio, U.S.A.*

1907 ‡ Schmassmann, W., *Beulah Lodge, London-road, Enfield,* N.

1930 ‡ Scott, Maj. F. B., I.A., *c/o Lloyds (Cox's & King's Branch), Pall Mall,* S.W.1.

1909 ‡ Scott, Hugh, M.A., Sc.D., F.L.S. (V.-Pres., 1926; Council, 1925–7), *British Museum (Natural History), Cromwell-road,* S.W. 7.

1929 Scott, P. W. A., 646, *Cornwell-st., Victoria, B.C., Canada.*

1911 Selous, C. F., M.D., M.R.C.S., L.R.C.P., 25, *Church-road, Tunbridge Wells.*

1923 Sen, S. K., M.Sc., *Imperial Institute of Veterinary Research, P.O. Muktesar, Kumaun, Dist. Naini Tal, U.P., India.*

1911†‡Sennett, N. S.

1931 ‡ Seth-Smith, D. W., M.R.C.S., L.R.C.P., *Zoological Gardens, Regent's Park,* N.W. 8.

1926 ‡ Sevastopulo, D. G., 147, *Gloucester-terrace, Hyde Park,* W.

1931 Seydel, Dr. Charles, *P.O. Box* 712, *Elizabethville, Katanga, Belgian Congo.*

1929 Shannon, Derek, *Gothic Cottage, Four Oaks-road, Four Oaks.*

1930 Sharga, U. S., M.Sc., *Dept. of Entomology, Cornell, Ithaca, N.Y., U.S.A.*

1924 ‡ Sharp, E. P., 1, *Bedfordwell, Eastbourne.*

1925 Shaw, F., *Maadi, nr. Cairo, Egypt.*

1886 Shaw, George T. (Librarian of the Liverpool Free Public Library), *William Brown-street, Liverpool.*

1931 Shaw, J. R., *Oakhurst, Waste-lane, Knowle, Warwickshire.*

1905 ‡ Sheldon, W. George, F.Z.S. (Treasurer, 1918–28; V.-Pres., 1920), *West Watch, Oxted, Surrey.*

1900†‡Shepheard-Walwyn, H. W., M.A.,

1923 Sherman, J. D., Jun., 132, *Primrose-avenue, Mt. Vernon, New York, U.S.A.*

1929 Shute, P. G., "*Litorea,*" *Temple-road, Epsom.*

1887†‡Sich, Alfred (Council, 1910–12), *c/o George Sich, Esq., Grayingham, Farncombe-road, Worthing.*

1911 ‡ Simes, J. A., O.B.E., *Kingsley Cottage, Queen's-road, Loughton, Essex.*

1904 ‡ Simmonds, Hubert W., *Dept. of Agriculture, Suva, Fiji.*

1921 ‡ Simms, H. M., B.Sc., *The Farlands, Stourbridge.*

1929 Simpson, Rev. Robert, M.Sc. *Cranleigh School, Surrey.*

1926 ‡ Simpson, R. G., *Verona, Manor Park-crescent, Edgware, Middlesex.*

1924 Simpson-Hayward, G. H., *Icomb Place, Stow-on-the-Wold, Gloucestershire.*

1928 Sinton, Major J. A., V.C., O.B.E., I.M.S., M.D., Director, Malaria Survey of India, *Kasauli, India.*

1926 Skinner, G. S., *Usine Ste. Madeleine, Trinidad, B.W.I.*

1922 Sloane, T. G., *Moorilla, Young, New South Wales, Australia.*

1906 ‡ Smallman, R. S., *Low Hedges, Worcester-road, Sutton, Surrey.*

1916 ‡ Smart, Major H. Douglas, M.D., B.S., 172, *High-road, Salway Hill, Woodford Green, Essex.*

1930 Smart, John, B.Sc., 4, *Chalmers-crescent, Edinburgh.*

1920 ‡ Smee, C., Govt. Entomologist, *Zomba, Nyasaland.*

1915 ‡ Smith, A. C., *Horton, Mornington-road, Woodford Green.*

1901 Smith, Arthur, *County Museum, Lincoln.*

1911 ‡ Smith, B. H., B.A., *Casa, Frensham Vale, Lower Bourne, Farnham.*

1929 ‡ Smith, C. Bramwell, 61, *Onslow-gardens, Muswell Hill*, N.10.
1924 ‡ Smith, F. Stanley, *Alpha Cottage, Datchworth, Knebworth, Herts.*
1919 Smith, S. Gordon, F.L.S., *Estyn, Boughton, Cheshire.*
1918 † Smith, W. P., F.Z.S., *Moorlands Broad-road, Sale, nr. Manchester.*
1925 Soliman, H. S., *Entomological Laboratory, Zoological Dept., Cambridge.*
1885 ‡ South, Richard (Council, 1890–1), 4, *Mapesbury-court, Shoot-up Hill, Brondesbury*, N.W. 2.
1908 ‡ Speyer, Edward R., *Ridgehurst, Shenley, Herts.*
1930 ‡ Squire, F. A., B.Sc., *Imperial College of Tropical Agriculture, St. Augustine, Trinidad, B.W.I.*
1930 Staley, John, *British Mosquito Control Institute, Hayling Island, Hants.*
1928 ‡ Steer, W., *East Malling Research Station, East Malling, Kent.*
1910 ‡ Stenton, R., 22, *Milton-road, Harpenden.*
1923 Stewart, A. M., 8, *Ferguslie, Paisley, N.B.*
1922 Stewart, B., *Lovell House, Leeds, Yorks.*
1920 ‡ Stidston, Engr.-Commander S. T., R.N., *Ashe, Ashburton, S. Devon.*
1918 ‡ Stiff, Rev. Alfred T., *All Souls' Vicarage, Brighton.*
1910 ‡ Stoneham, Lt.-Col. Hugh F., O.B.E., F.Z.S., M.B.O.U., *The Stoneham Museum, Kitale, Kenya Colony.*
1915 ‡ Stott, C. E., *The Mount, Armitage, nr. Stafford.*
1927 Strand, Prof. Dr. Embrik, M.A.N., F.L.S., F.Z.S., etc., *Director, Systematic Zoological Institute and Hydrobiological Station, Latvian University, Riga, Latvia.*
1925 Swiestra, C. J., *Director, Transvaal Museum, Pretoria.*
1876 ‡ Swinton, A. H., *Oak Villa, Braishfield, Romsey, Hants.*
1911 ‡ Swynnerton, C. F. M., *Shinyanga, Tanganyika Territory.*
1920 ‡ Syms, Edgar E., 22, *Woodlands-avenue, Wanstead*, E. 11.

1910 Tait, Robt., junr., *Covertside, Moss-lane, Ashton-on-Mersey.*
1908 ‡ Talbot, G., *Mon Plaisir, Wormley, Surrey.*
1920 ‡ Tams, W. H. T. (Council, 1927–9), 5, *Daisy-lane, Fulham*, S.W. 6.
1918 Tapp, Maj. W. H., M.C., F.R.A.S., F.R.G.S., *Clifton House, South Side*, S.W. 19.
1916 Tatchell, L. S., *Swanage, Dorset.*
1931 Taylor, J. Sneyd, M.A., Division of Entomology, *P.O. Box* 513, *Pretoria, S. Africa.*
1903 Taylor, T. H., M.A., *The University, Leeds.*
1914 Temperley, Reginald, *The Manor House, Merricott, Somerset.*
1925 Thompson, H. W., *Research Dept. in Agriculture, University College, Cardiff.*
1901 ‡ Thompson, M. L., 40, *Gosford-street, Middlesbrough.*
1928 ‡ Thompson, W. R., Ph.D., D.Sc., *Farnham House Laboratory, Farnham Royal, Bucks.*
1892 Thornley, The Rev. A., M.A., F.L.S., F.R.Met.Soc., *St. Anaels, Carbis Bay, Cornwall.*
1926 ‡ Thorpe, W. H., M.A., Ph.D., *Farnham House Laboratory, Farnham Royal, Bucks.*
1907 ‡ Tillyard, R. J., M.A., D.Sc., F.R.S., F.L.S., Chief Commonwealth Entomologist, *G.P.O., Box* 18, *Canberra, F.C.T., Australia.*

1920 Tinsley, Joseph, *West of Scotland Agricultural College, Morven, Seafield-road, Ayr.*
1897 ‡ Tomlin, J. R. le B., M.A. (Council, 1911–13), 23, *Boscobel-road, St. Leonards-on-Sea.*
1907 ‡ Tonge, Alfred Ernest (Council, 1915–17, 1927–29), *Aincroft, Reigate, Surrey.*
1920 Tonge, Alfred E., *Ashville, Trafford-road, Alderley Edge, Cheshire.*
1914 de la Torre Bueno, J. R., 38, *De Kalb-avenue, White Plains, New York, U.S.A.*
1928 ‡ Tottenham, Rev. C. E., 18, *Tyrone-road, Thorpe Bay, Essex.*
1927 Townsend, A., *Leam Grange, Warwick New-road, Leamington Spa.*
1906 ‡ Tulloch, Brig.-Gen. J. B. G., C.B., C.M.G., *Hill-court, Abergavenny, Monmouthshire.*
1895 ‡ Tunaley, Henry, *Castleton, Searle-road, Farnham.*
1910 Turati, Conte Emilio, 4, *Piazza S. Alessandro, Milan, Italy.*
1930 ‡ Turk, F. A., F.Z.S., 18, *Fernside-road, Balham,* S.W. 12.
1898 ‡ Turner, A. J., M.D., *Wickham-terrace, Brisbane, Australia.*
1893 ‡ Turner, Henry Jerome, F.R.H.S. (V.-Pres., 1930; Librarian, 1921–9; Council, 1910–12, 1930), *Latemar, West Drive, Cheam, Surrey.*
1931 Tweedie, R. B., "*Blandfords,*" *Chartridge, Chesham, Bucks.*
1923 ‡ Twidle, A., N.S.A., *The Rowans, Godstone Green, Surrey.*

1893 ‡ Urich, F. W., C.M.Z.S., 107, *Frederick-st., Port of Spain, Trinidad, B.W.I.*
1920 ‡ Uvarov, B. P., *British Museum (Natural History), S. Kensington,* S.W. 7.

1923 ‡ Valentine, A., *Grand Hotel, Herne Bay, Kent.*
1922 ‡ Van Someren, V. G. L., C.M.Z.S., *Box* 658, *Nairobi, Kenya Colony.*
1924 ‡ Van Straubenzee, Brig-Gen. Casimir C. H., C.B., C.B.E., 6, *Sussex Mansions, Sussex-place,* S.W. 7.
1931 Vardé, V. P., D.Sc., *Locust Research Laboratory, Agricultural College, Lyallalpur, Punjab, India.*
1904†‡Vaughan, W.
1914 ‡ Veitch, Robert, B.Sc., *Dept. of Agriculture, Brisbane, Australia.*

1897 ‡ Wainwright, C. J. (Council, 1901, 1912–14), 172, *Hamstead-road, Handsworth, Birmingham.*
1918 Walford, L. J., *The Cavalry Club, Piccadilly,* W.
1878 ‡ Walker, J. J., M.A., R.N., F.L.S. (President, 1919–20; V.-Pres., 1916, 1921; Sec., 1899, 1905–18; Council, 1894, 1921), *Aorangi, Lonsdale-road, Summertown, Oxford.*
1921 Walker, S., 53, *Micklegate Hill, York.*
1928 Walsh, Mrs. H. S., *Societeits Straet,* 5, *Soekaboemi, Java.*
1919 ‡ Ward, J. Davis, *Limehurst, Grange-over-Sands, Lancs.*
1910 ‡ Ward, John J., *Natura, Woodland-avenue, Coventry.*
1908 ‡ Warren, B. C. S., 14, *Avenue de l'Eglise Anglaise, Lausanne, Switzerland.*
1901 † Waterhouse, G. A., D.Sc., B.E., *Allowrie, Stanhope-road, Killara, New South Wales, Australia.*
1921 Watkinson, The Rev. G., M.A., *Woodfield, Hipperholme, nr. Halifax.*
1918 Watson, J. H., 70, *Ashford-road, Withington, Manchester.*

1914 Watt, Morris N., M.B., Ch.B., F.R.M.S., *Pathology Dept., Medical School, Dunedin, New Zealand.*

1923 † West, Lieut.-Col. R. M., M.D., D.S.O., O.B.E., *Wootton Bridge, Isle of Wight.*

1906 ‡ Wheeler, The Rev. George, M.A., F.Z.S. (Secretary, 1911–21; V.-Pres., 1914; Council, 1921), *Ellesmere, Gratwicke-road, Worthing.*

1910 ‡ White, E. Barton, M.R.C.S., *The Mental Hospital, Fishponds, Bristol.*

1918 White, Ronald Senior, *Central Research Institute, Kasauli (Simla Hills), India.*

1930 Whitehouse, Prof. Beckwith, 62, *Hagley-road, Birmingham.*

1923 ‡ Whitfield, F. G. Sarel, *Wellcome Tropical Research Laboratories, Entomological Field Station, Talodi, Kordofan, Sudan.*

1913†‡ Whitley, P. N., *Brantwood, Halifax;* and *New College, Oxford.*

1921 ‡ Whitney, W. B., Ph.D., A.M.Inst.C.E., *Glen Doone, Bull-lane, Gerrard's Cross, Bucks.*

1913 † Whittaker, Oscar, F.R.M.S., 1143, *Esquimalt Avenue, Hollyburn, British Columbia.*

1911–1920, 1925:

‡ Whittingham, Rt. Rev. A. G., Lord Bishop of St. Edmundsbury and Ipswich, *The Bishop's House, Ipswich.*

1917 ‡ Wickham, Rev. Prebendary A. P., *East Brent Vicarage, Highbridge, Somerset.*

1926 ‡ Wigglesworth, V. B., M.A., M.D., B.Ch., *"Hedgeside," Holtspur End, Beaconsfield, Bucks.*

1923 Wightman, A. J. C., *Aurago, Pulborough, Sussex.*

1922 ‡ Wilkinson, D. S., *c/o Imperial Institute of Entomology, British Museum (Natural History), Cromwell-road,* S.W. 7.

1923 Wilkinson, Harold, *Dept. of Agriculture, Nairobi, Kenya Colony.*

1911 ‡ Williams, C. B., M.A., Sc.D., *Rothamsted Experimental Station, Harpenden, Herts.*

1915 Williams, H. B., LL.D., *Littledene, Clairmont-lane, Esher, Surrey.*

1921 ‡ Willmer, E. Nevill.

1922 Wilson, F. E., *"Cyathea," Ferncroft-avenue, E. Malvern, Victoria, Australia.*

1919 † Wilson, Lt.-Col. R. S., *Army and Navy Club, Pall Mall,* S.W.

1915 Winn, A. F., 32, *Springfield-avenue, Westmount, Montreal, Canada.*

1928 Winter, A. E., 148, *West End-avenue, Harrogate.*

1926 ‡ Womersley, H., 26, *Marita-rd., Claremont, Perth, W. Australia.*

1928 ‡ Wood, Hugh, *Rollrights, Milford-on-Sea.*

1919 ‡ Wood, H. Worsley, 37, *De Freville-avenue, Cambridge.*

1905 Woodbridge, F. C., *Briar Close, Latchmore-avenue, Gerrard's Cross S.O., Bucks.*

1925 Woodcock, A. J. A., M.Sc., *Clifton Manor, York.*

1925 ‡ Woodward, Capt. G. C., R.N., *Training Ship "Cornwall," Denton, nr. Gravesend, Kent.*

1921 Woolett, G. F. C., *Sipilang, Province Clarke, B.N. Borneo.*

1926 ‡ de Worms, C. G. M., *Milton-road, Egham, Surrey.*

1922 Wright, A. E., *Burnleigh, Kent Bank-road, Grange-over-Sands.*

1927 ‡ Wright, W. Rees, M.Sc., *Dept. of Zoology, The University of Manchester.*

1926 ‡ Wyatt, C. W. fforde, 14, *Cavendish-square,* W. 1.

1925 ‡ el Zoheiry, M. Soliman, *Plant Protection Section, Ministry of Agriculture, Cairo, Egypt.*

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G. T. Bethune-Baker, £30, towards the cost of the plates in his paper.

E. A. Elliott, in continuation of his practice since 1908, Wytsman's " Genera Insectorum," amounting to a total value of £225.

The Royal Society, £100, towards the cost of Mr. H. S. Pruthi's paper.

1926.

The Royal Society, £150, towards the cost of Mr. Warren's paper.

1927.

Rev. F. D. Morice (bequest) £200.

Prof. E. B. Poulton, F.R.S., authorised contribution from the Fund for promoting the study of organic and social evolution, presented to the University of Oxford by Professor J. Mark Baldwin, £40 16*s*.

1928.

Col. J. W. Yerbury (bequest) £50.

1929.

The Empire Marketing Board, £96 8*s*. 5*d*., the entire cost of Mr. B. P. Uvarov's paper.

Prof. E. B. Poulton, F.R.S., authorised contribution from the Fund for promoting the study of organic and social evolution, presented to the University of Oxford by Professor J. Mark Baldwin, £85 11*s*.

The Royal Society, £90, towards the cost of Mr. F. W. Edwards' paper.

1930.

R. W. Lloyd, the entire cost of the panelling and ceiling in the new Meeting Room, together with the Presidential Desk and Chair.

R. Adkin, the entire cost of the Epidiascope and screen.

Dr. K. Jordan, £50 donation in aid of building the new Meeting Room.

H. Willoughby Ellis, £50 donation in aid of building the new Meeting Room.

Dr. R. Stewart MacDougall, £110, being the cost of a bookcase and table for the Library, in memory of his wife.

Jesus College, Oxford, through Professor E. B. Poulton, F.R.S., £25.

Mdme. A. de Horrack-Fournier, cost of plate illustrating Mr. Lathy's paper, £20 5*s*.

The Trustees of the Carnegie (U. K.) Fund, £500 for the purchase of books for the Library.

Mrs. Eaton, a selection of books from the Library of her husband.

E. A. Elliott, in continuation of his practice since 1908, Wytsman's *Genera Insectorum*.

P. I. Lathy, *Thèses entomologiques*, copy No. 2, including a proof set of the plates, uncoloured.

1931.

Empire Marketing Board, towards the cost of Mr. B. P. Uvarov's paper, £231.

Prof. E. B. Poulton, F.R.S., authorised contribution from the Fund for promoting the study of organic and social evolution; presented to the University of Oxford by Professor J. Mark Baldwin, £110.

Jesus College, Oxford, through Prof. E. B. Poulton, F.R.S., £20.

Board of the Carnegie Fund in South Africa, the entire cost of the plates illustrating Prof. A. J. T. Janse's paper.

tion from Entebbe, and one caught by another native collector at the same locality, shows that none of them can be described as of the new form *lycioides*, although three are transitional towards that form: it appears that *lycioides* has not yet developed on the mainland. The following summary can be made of these sixteen specimens as regards each of the points described in which *lycioides* differs from *althoffi*.

A. *Amount of black in area* 1*a*.
Normal in 13, somewhat suffused with white in 3.

B. *Amount of black in area* 2.
Normal in 11, slightly suffused with white in 3, absent in 2.

C. *The "Fork Spot" in area* 1*b*.
Absent in 1, present in normal small size in 12, somewhat enlarged in 3.

D. *Black border of hind-wing.*
Normal in 9, slightly more suffused with white in 2, much suffused in 5.

E. *Brown at base, underside.*
Well marked in 8, a faint trace in 5, represented by bars between spots in 3.

I am indebted to Mr. N. D. Riley for the following note on additional specimens of *A. althoffi althoffi* in the National Collection. Dr. S. A. Neave took three near Entebbe and one in the Mabira forest between Kampala and Jinja. In all four specimens the proximal black spot in area 1*b* on the upperside of the fore-wing is completely surrounded by the dark ground-colour which also reaches fully up to the other two spots. There are also four specimens taken by Gowdey at Entebbe which agree perfectly with Neave's specimens, except that in one the spot in area 2 is definitely isolated from the black ground-colour. In two of Neave's specimens from Entebbe there are at the base of the hind-wing on the underside obvious brownish bars joining the basal spots longitudinally. In the third, and in the Mabira specimen, the bars are only visible under a lens.

I have also examined 16 specimens of the form *telloides*, mimicking *Acraea jodutta dorotheae* and *Planema tellus*, and find that there is only a faint darkening of the general orange-brown colour at the base of the hind-wing on the underside in 11 of them and none at all in the remaining 5.

The male specimen of *A. althoffi* exhibited in the series mentioned above bears evidence of attack by a bird, the left hind-wing having a very clear imprint of a long narrow beak, possibly that of a bee-eater, directed forwards from the most prominent part of the posterior margin. The grip of the beak must have been strong to leave such a clear print, yet the wing is undamaged, evidence alike of the toughness of the distasteful butterfly and the probability that it was deliberately released on account of its distasteful quality.

Remarkable aberration of *Charaxes numenes*, Hew.

Dr. G. D. Hale Carpenter exhibited a male specimen of *Charaxes numenes*, Hew., taken by a native collector in the forest near Entebbe, Uganda, between June 24th and 30th, 1928. The under-surface shows replacement of the normal variegated markings by blue-black of the same hue as the normal dark spots. On the fore-wing this blue-black covers uniformly the basal three-quarters of the cell;

the base of cellule 2 as far as the level of the cross-vein bounding the cell distally; cellule 1*b* as far as the pale area on the proximal side of the two dark spots near the anal angle which are not blotted out; and the whole of cellule 1*a* as far as the angle of the wing. The rest of the fore-wing shows a uniform grey-brown ground-colour with a lighter suffusion parallel with the outer margin.

The underside of the hind-wing shows a row of white spots parallel with the border not differing greatly from the normal. The normal irregular lunular marks internal to these spots are missing. The next marking of the normal wing towards the base, a white streak directed from before backwards, is replaced by a somewhat broader black streak, and such is also the case with the proximal white streak near the base of the wing, but in this locality the blue-black colour forms a broad patch limited on the inner side of the wing by the first branch of the median vein.

On the upperside there is little difference from the normal on the fore-wing, but the hind-wing is more aberrant. The yellow border is reduced to a minimum, the white submarginal spots are more conspicuous, and the inner row of light blue markings is very faintly visible.

Variety of *Hypolimnas salmacis.*

Dr. Hale Carpenter also exhibited a variety of *H. salmacis* form *platydema*, R. & J., a female in which the white area across the centre of the fore-wing and the white patch on the hind-wing of the normal form are replaced by a rich cream colour, with very beautiful effect. The specimen was captured by a native collector in the forests near Entebbe, Uganda, during the first week of July 1928. This form was named *ochreata* by Joicey & Talbot in 1921, *Bull. Hill Mus.*, **1** : 56.

Stenophylax dubius, Steph., from Windsor Forest.

Mr. Donisthorpe exhibited a specimen of the very rare *Stenophylax dubius*, Steph., and said that when fishing for water-beetles in a stream in Windsor Forest on October 2nd last, he had noticed a Trichopteron on the water net. It was seen to be darker in colour than any other species he had seen and was promptly captured. He had referred it to Mr. Martin E. Mosely at the British Museum, who had written as follows respecting it.

" The Trichopteron is *Stenophylax dubius*, Steph. Maclachlan writes of it: 'said by Stephens to have been taken near London (but the species has not again been found in England).' This was written in 1874. The species has been taken on the Continent in Germany, Galicia, Croatia, Finland, Russia and Courland, but, so far as I know, your capture is the first that has been made in Britain or, at any rate, recorded, since Stephens described it in 1837. His type is in the British Museum Collection and is the only example there of the species.

" You are heartily to be congratulated on making so interesting and valuable a discovery."

Agriades thetis (*bellargus*) ab. ♀ *coelestis.*

Mr. Simes exhibited a series of the Lycaenid butterfly *Agriades thetis* (*bellargus*), including a number of examples of the ab. ♀ *coelestis*, Oberthür, from the Dept. Charente, S.W. France. He said he had found the species in abundance in the country round Angoulême in June 1931, and that the great majority of individuals did not differ appreciably from those found in other districts of France and elsewhere. Taking the district as a whole, he did not think that more than about 3 per cent. of the females were of the *coelestis* form. He also exhibited two examples of the hybrid *polonus*, one of which was taken flying with the *thetis* at Angoulême, the other having been taken, also flying with *thetis*, in the Dept. of Var, France, in July 1920.

Mr. C. B. SMITH also exhibited a series of *Agriades thetis* with ab. ♀ *coelestis* from the Charente.

The Epigamic Behaviour of the Male *Empis opaca*, F. (Dipt., EMPIDAE).

Mr. B. M. HOBBY said that he had observed the habits of *Empis opaca* in a meadow at Headington near Oxford, during May and June, 1931. He was able to confirm, and in some respects to amplify the account of this species given by Hamm (1909, *Ent. Mon. Mag.*, **45** : 132 & 157) and Gruhl (1924, *Z. wiss. Zool.* **122** : 248). In this species, as in many other EMPIDAE, prey caught by the male was displayed in courtship and transferred to the female at the moment of mating. So far as was known, males without prey made no attempt to pair; nor was it likely that any such attempt would be successful. The male invariably caught the prey—generally a Bibionid fly—on the wing and then usually alighted to disable it by probing the thorax several times with his proboscis. It was therefore probable that specialised poison glands were either absent or but little developed—a conclusion supported by the fact that the prey sometimes remained alive when presented to the female. There was no evidence that the males ever devour their prey.

A male, having disabled his prey, carried it off, flying over and about the long meadow grass where he was occasionally joined by other males also carrying prey. Evidently attracted by this display, several females soon flew up from their resting-places among the grass and drifted slowly over the males. Pairing always took place in the air and consequently precise details could not be observed. It was clear, however, that the male approached the female from below; that at the instant of mating the female took possession of the prey; that the pair fell a short distance in the air before recovering and flying off to settle in the grass. It could then be seen that the male was uppermost but that the tip of his abdomen was bent round beneath that of the female. According to the terminology proposed by Lamb (1922, *Proc. Roy. Soc.*, B. **94** : 1), this relation of the sexes should be called "false male vertical pose." Richards (1927, *Biol. Rev.*, **2** : 335) has pointed out that in order to reach such a position the male "had to pull himself up on one side of the female," and that for an instant, "this made it impossible for her to use her wings"; hence the fall observed at the moment of mating.

A pair at rest was always supported by the male, who hung by his anterior legs, gripped the thorax of the female in the region of the humeri by his middle legs, and extended his long hind legs downwards behind the wings of the female and forwards beneath her ventral surface. He thus retained his hold upon the prey in spite of the fact that it was clasped by all six legs of the female and was continually turned about as she probed it with her proboscis. Pairs remained *in coitu* for a minimum period of 20 seconds and for a maximum of 5 minutes. After separating, the male usually carried off the prey, which, however, was often dropped. It was never retained by the female. The following record was typical of many observations. A male, 45 seconds after catching a small Bibionid fly, mated and remained *in coitu* for 2 minutes. Then, still retaining the prey, he flew off and settled on a grass stem, where he rested for 2 minutes. At the end of this period he rose in the air with the same prey and paired with a second female. Pairing lasted 1 minute, and the prey was dropped when the insects separated. It was possible that on other occasions a male might retain and use the same prey to attract several females.

On three different days a gentle breeze was blowing across the meadow, stirring up the vegetation and carrying the pappus-bearing seeds of composite flowers. Although no actual capture was witnessed, these drifting seeds were evidently seized by the males in place of the usual insect prey. In all, 15 pairs and 2 males were taken with dandelion (*Taraxacum officinale*, Vill.) seeds and 4 pairs with small balls of broken pappus containing entangled groundsel (*Senecio vulgaris*, L.) seeds. It was evident that the seed-carrying males were as successful in finding mates as were those with insect prey.

Following the system of nomenclature proposed by Professor Poulton in his book *The Colours of Animals*, London, 1890, these seeds displayed in courtship should be termed allepigamic objects.

Eltringham and Hamm (1928, *Proc. Roy. Soc.*, B. **52** : 327) and others had shown that prey caught by the males of certain species of *Hilara* was enclosed in an elaborate " balloon " of silk and then offered to the female. Sometimes the prey was replaced by an object (*e.g.*, a petal) obviously unsuitable for food, while occasionally the " balloon " was empty. " Balloons dropped upon the water " were " readily picked up and used over again by other males." The present observations on *Empis opaca* afforded confirmatory evidence that in such EMPIDAE with specialised habits the prey had lost its more primitive significance as food and had become important in some other way.

The composite seeds had been kindly determined by Dr. A. R. Clapham of the University Botanical Laboratory, Oxford. The above mentioned material may be seen in the Hope Dept., University Museum, Oxford.

The gregarious sleeping habits of a Heliconian and an Ithomiine butterfly in Trinidad, observed by P. Lechmere Guppy.

Prof. POULTON said that Mr. Guppy had now kindly made fresh observations and had sent the specimens exhibited, confirming his letter of 8 May, 1931, quoted in the present volume of *Proceedings* (p. 9, *n.*). The exhibit included five males and two females of *Heliconius h. hydarus*, Hew., being 7 out of the 8 specimens observed in two groups of four each on 31 Aug. 1931, as described in the following extract from his letter of September 2; also one female of the same species taken September 1, and a female of the Ithomiine *Tithorea* (*Hirsutis*) *megara*, Godt., labelled August 31. All the specimens were taken on the St. Ann's River.

" 1 *Sept.*, 1931.—I have been able recently to obtain some information relating to sleeping habits of Heliconians.

" On 31/8/31 I found two lots of these on bushes under a canopy of bamboos.

There were four specimens in one lot hanging from ends of dried twigs, in a conspicuous position. In the other lot of four about fifty yards down the St. Ann's River they were resting in a similar manner. Most of the time water would be running immediately below their sleeping-places, which are about seven feet above the water. On being captured they exude a pungent odour of cashew-nut oil (*Anacardium occidentale*).

"The Heliconians sleep very close to one another, sometimes touching, and not infrequently there are specimens of *Tithorea megara flavescens* in close proximity. I may add that on visiting the same locality (in the river) the following day (dry at the moment) I only found two Heliconians. I expect that later in the year the sleeping colonies will be stronger in numbers. On my second visit two specimens of *T. megara* were resting in the same spot. I enclose a specimen with 8 Heliconians, which I am sending to you under separate cover with a rough sketch showing sleeping posture."

The sketch clearly showed the position of the clustered Heliconians, hanging from the tips of the dried twigs under the over-arching bamboos 50 to 70 ft. in height.

The presence of the Ithomiine was of much interest, suggesting the advantage which may be gained by a sleeping association which includes species with utterly different warning patterns, but having in common the power of emitting a warning scent. Further observations on such associations were much to be desired.

The odour of cashew-nut oil * appeared to be an addition to the scents detected in this *Heliconius*. It would be remembered that Dr. G. B. Longstaff had compared the odour of *H. h. hydarus* at first to that of acetylene, but later to witch-hazel (*Hamamelis*), also recognised as emitted by the subspecies *H. h. columbinus*, Staud., by Miss C. Longfield and Mr. C. L. Collenette. The late Dr. C. L. Withycombe detected in *H. h. hydarus* the characteristic smell of carbylamine which was replaced by a sweetbriar-like scent on heating with distilled water and hydrochloric acid. An extract received from him emitted, on arrival, the carbylamine odour which soon changed to that of *Hamamelis* (1925, *Proc. Ent. Soc., Lond.*, **1925** : xxxvii; 1926, **1** : 20).

A beautiful Geometrid moth new to Trinidad.

Prof. POULTON also exhibited a female specimen of *Opisthoxia nitidisquama*, Warr. (GEOMETRINAE), from St. Ann's, Port-of-Spain. Mr. H. Lechmere Guppy, who had kindly sent the insect, wrote "taken at electric light, 11 August, 1931. Alights with wings held upright, semiclosed. Walks rapidly." Mr. W. H. T. Tams had kindly determined the species, which was unknown to Mr. W. J. Kaye, from Trinidad. Two specimens, also females, exist in the British Museum Collection, one from British and the other from French Guiana.

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* Mr. H. Lechmere Guppy has since written (October 13) that "it is the *acrid blistering* oil from the *shells* that smells so repellant (like the Heliconians), not the oil from the *kernel*, which is not unlike *Lucca* oil and of course edible. The former is extracted from the *shells* after removing the kernels, and this bye-product is useful for waterproofing purposes. When freshly extracted it stains and blisters."

Mr. Guppy also adds that he has "noticed certain other butterflies that are rather partial to company when it becomes dusk. *Danais eresimus* and *Mechanitis* spp. require watching for somewhat similar habits to those of the Heliconians."—E. B. P. 1 Nov. 1931.

Insect carriers of Orchid pollinia, collected by Col. M. J. Godfery.

Prof. POULTON exhibited the following interesting examples kindly sent to him by Col. Godfery:—

Empis tessellata, F. (Diptera: EMPIDAE), ♂♀♀. Taken on *Orchis elodes*, Holmsley, New Forest; 13 June, 1931. Each of the flies bears one or more pollinia on its head.

The hive-bee, *Apis mellifica*, L., Worker. On *Himantoglossum hircinum*, Cannes, 6 May, 1931. Eight pollinia are borne by the mouth-parts.

The bee, *Halictus leucozonius*, Schr., ♀. On *Orchis maculata*, exposed in garden at Windacres, Guildford, 21 June, 1931. Two pollinia are attached to the face. One or two similar insects came to the flowers.

The Sawfly, *Dolerus picipes*, Kl. (Hymenoptera: TENTHREDINIDAE), ♀. On *Cephalanthera ensifolia*, West Meon, Hants., 8 June, 1931. Placed in a box with *Listera ovata* the insect withdrew four pairs of pollinia on proboscis and one pair on leg.

The Sawfly was kindly determined by Mr. R. B. Benson, in the Natural History Museum, other insects by Mr. A. H. Hamm, in the Hope Department.

Wednesday, November 4th, 1931.

Dr. H. ELTRINGHAM, F.R.S., President, in the Chair.

Election of Fellows.

The following were elected Honorary Fellows of the Society:—Dr. WALTHER HORN, 20 Gosslerstrasse, Berlin-Dahlem, Germany; M. RENÉ OBERTHÜR, Rennes, Ille-et-Vilaine, France.

The following were elected ordinary Fellows of the Society:—J. W. COWLAND, Wellcome Tropical Research Laboratories, Khartoum, Sudan; DENYS MELVILLE FARRELL, Department of Agriculture, Trinidad, B.W.I.; Colonel G. K. GREGSON, D.S.O., Cob Orchard, Plaxtol, Kent; Prof. S. T. ISSIKI, School of Agriculture, Taihoku University, Formosa, Japan; Prof. JOHN GRAHAM KERR, The University, Glasgow; W. B. R. LAIDLAW, Forestry Department, The University, Aberdeen; LOUIS ANDRÉ MOUTIA, 57, Avenue d'Italie, Paris, France; WALTER REGINALD BROOK OLIVER, Dominion Museum, Wellington, N.Z.; KENNETH LEWIS PALMER, Meadowlea, Gobowen, Shropshire; TARLTON RAYMENT, Bow-worrung, Sandringham, Victoria, Australia.

Exhibits.

Oviposition Stimuli of *Euaresta aequalis*, Lw.

Sir GUY MARSHALL exhibited, on behalf of Dr. R. J. Tillyard, F.R.S., and Mr. G. A. Currie, Senior Entomologist, Canberra, Australia, photographs of a Trypetid fly, *Euaresta aequalis*, Lw., ovipositing in artificial burrs made of rubber studded with bent pins, in imitation of the burrs of *Xanthium pungens*. Experiments appear to indicate that the stimulus to oviposition consists in the shape of the object combined with the presence of spines, neither factor being effective alone.

British Examples of *Pararge maera*.

Mr. N. D. Riley, exhibited on the behalf of Major W. J. de Monté Pendlebury, M.A., F.E.S., a male of the continental Satyrid butterfly, *Pararge maera*, taken at Shrewsbury on August 28th, 1930, and a female captured in the same locality on September 2nd, 1931. Both the specimens were secured by Mr. Clive Tanner; the male sunning itself on a garden path, and the female on the curtain of a window, at Meole Brace. The species is very similar to the English Wall Brown, *Pararge megera*, and the two specimens exhibited had apparently been mistaken by the captor for that species. No explanation of this remarkable occurrence was forthcoming.

Acraeine butterflies congregating in a small area for the night's rest, observed by Dr. Hale Carpenter in Portuguese East Africa.

Prof. Poulton exhibited the fifteen Acraeas referred to in the following note written by his friend Dr. Hale Carpenter :—

"All these taken in area, few yards square, of tall dry grass-stems on which they were settling, freely exposed for the night, 4.30–5.30 p.m., Ankwabe, 24.vii.1918."

The elevation of the locality (13° S.; 40° E.) was about 1000 ft.—a country of deciduous bush with small trees. The observation was made in a very dry season.

The species of *Acraea*, in the order of their relative numbers, were as follows :—*Acraea oncaea*, Hoppf. (*doubledayi*, Trim.)—4 ♂♂, 3 ♀♀; *A. asema*, Hew., f. *gracilis*, Wichgr.—2 ♂♂, 3 ♀♀; *A. caldarena*, Hew.—1 ♂, 1 ♀; *A. terpsichore rougeti*, Guér. —1 ♂.

It was very interesting to learn from this record that the conspicuousness of this distasteful, much-mimicked group is increased by the formation of sleeping assemblages, as in the Heliconinae and Danainae recently discussed in our *Proceedings*.

Hippotion celerio, L., taken on a motor-car at Oxford by C. H. Burden.

Prof. Poulton exhibited a specimen of the "Silver-striped Hawk-moth," kindly presented to the University Collection by the captor, as recorded in the *Ent. Mon. Mag.* for November 1931 (p. 246). The perfect condition of the specimen pointed to the conclusion that the moth had alighted on the car when it was stationary.

Observations, nearly eighty years old, on Pompilid wasps and spiders in California.

Prof. Poulton said that his friend Mr. William G. Wallace had kindly lent him a letter written to his grandmother by his uncle John Wallace, who went to California in 1849. This letter, dated 28 August, 1854, from Columbia, includes the following interesting account of a "fly,"—evidently a Pompilid Fossorial Wasp,—which attacks spiders.

". . . You have, I suppose, heard of large spiders that catch birds and large insects. Well, we have them here and they are called Tarantula's, but they are not the real Tarantula although they say their bite is poisonous, and I dare say it is, as they have a pair of tremendous fangs and when you get them mad they will bite a piece of stick and you will see the poison ouse * out of the fangs. Well, but probably you never heard of the fly that destroys the spider, but we have such a one here, and I believe that it is the veritable 'blue-tailed fly' † that you read about, as he is blue all over and blue wings with a tinge of red on them,‡ and I believe, too, he has a tremendous sting, and is about as large as a wasp, and some are a little larger. This fly will, however, attack the large spiders whenever they can find them and whether they eat them or not I do not know, but I saw one hauling along a very large spider one day. The spider was alive and the fly had hold of him by the head and was dragging him along, the fly having to walk backwards and making the spider follow him. At first I thought naturally that the spider was lugging off the fly, so I separated them but the fly appeared very indignant at my interference and instead of flying away, as I suspected, returned again to the spider and commenced dragging him along as before. The spider was very large with a body as large as a walnut and immense long hairy legs and to appearance could have eaten up a dozen such flies as the one that had him in tow, but he appeared to have been rendered perfectly powerless, just crawling along as the fly dragged him. Where they went to or what was done with him I do not know as I could not stop to watch them. But since then I observed one with a smaller spider which was quite dead and the fly was dragging him along with considerable rapidity, crawling backwards as before and dragging the spider after him. I watched him for some time till he arrived at the edge of a small pool of water about a yard wide. He appeared to be rather puzzled, but after flying across the water and reconnoitering the opposite bank he returned and pushing the spider into the water laid hold of him and by the assistance of his wings held him up and floated him across on the water and then started on as before. He appeared to go in nearly a straight line over heaps of dirt or stones, and I finally left him as I could not wait to watch him any further."

Prof. Poulton said that, although Mr. Wallace thought little of his own observations, remarking "I have no more nonsense to tell you about just now," § the facts last mentioned had hardly ever been recorded, and were new to him until Mr.

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* Given as an obsolete form of "Ooze" in the *Oxford English Dictionary.*

† The words "blue-tailed fly" struck a chord in memory and, with the help of the President and other Fellows, were traced to a Plantation song—"So early in de morning." Dr. F. W. Edwards had kindly supplied the relevant verse from the *Fellowship Song-Book* :—

> "When I was young I used to wait,
> On Massa's table lay de plate;
> Pass de bottle when him dry,
> Brush away de blue-tailed fly."

We might perhaps infer from the last line that the contamination of food by flies—Dr. Edwards thinks probably species of *Calliphora*—was recognised when the song was written.

‡ Mr. R. B. Benson has kindly written :—

"The identity of this Californian Psammocharid is impossible for us to settle for certain. I have referred to Bank's paper and, of the species recorded therein from North West America, there are none which have wings blue and also with a tinge of red. There are three species with large areas of red on the basal part of the wing, and, in our old specimens, with fuscous margins (which were probably blue in living specimens), namely *Pepsis mildei*, Stål, *P. cinnabarina*, Lucas, *P. formosa*, Say. It might be any of these three species."

§ The sentence preceding these words—"The letter from the lad Alfred took out with him is very interesting and well written"—refers to Charles Allen, a youth of sixteen taken as an assistant to the Malay Archipelago, and often mentioned in A. R. Wallace's great work.

O. W. Richards kindly directed his attention to *Life in Inland Waters*, by Needham & Lloyd (Ithaca, N.Y., 1916), where the authors describe the habits of *Priocnemis flavicornis*, on Fall Creek, at the Cornell Biological Field Station. This Pompilid wasp " flies above the surface [of the water] towing a load too heavy to be carried. The freight is the body of a huge black spider several times as large as the body of the wasp. . . . It could scarcely be dragged across the ground, clothed as that is with the dense vegetation of the waterside; but the placid stream is an open highway. . . . She sails a direct and unerring course to the vicinity of her burrow in the bank and brings her cargo ashore. . . . She hauls it upon the bank and then runs to her hole to see that all is ready. Then she drags the spider up the bank and into her burrow. . . ." (pp. 330–1).

Our British POMPILIDAE so far as they have been observed, did not bring the spider to a hole already prepared but dig one for the captured prey. Mr. Wallace's observation suggested that the Californian spider was being conveyed to an existing burrow and this was definitely recorded in the above-quoted passage, as also in the charming book *On the Instincts and Habits of the Solitary Wasps* (Madison, Wis., 1898), where G. W. and E. G. Peckham give an account of *Pompilus scelestus*, Cresson, which " had made her nest but was not ready to fill it." The hole was first seen by the authors at 2.0 p.m. on one day and a spider brought to it at 1.30 p.m. on the following day (pp. 157, 158).

Wednesday, November 18th, 1931.

Dr. H. ELTRINGHAM, F.R.S., President, in the Chair.

Nominations.

The SECRETARY read the following list of Fellows nominated by the Council for the ensuing year :—

For President : H. ELTRINGHAM, M.A., D.Sc., F.R.S.
For Treasurer : Capt. A. F. HEMMING, C.B.E.
For Secretary : S. A. NEAVE, M.A., D.Sc.

For other members of Council :—H. W. ANDREWS, Capt. E. BAGWELL-PUREFOY, F.Z.S., Sir T. HUDSON BEARE, B.Sc., F.R.S.E., K. G. BLAIR, B.Sc., G. H. CARPENTER, D.Sc., M.R.I.A., H. ST. J. K. DONISTHORPE, F.Z.S., Major R. W. G. HINGSTON, M.C., A. D. IMMS, M.A., Sc.D., F.R.S., R. W. LLOYD, Miss CYNTHIA LONGFIELD, Sir GUY A. K. MARSHALL, C.M.G., D.Sc., F.R.S., Prof. E. B. POULTON, M.A., D.Sc., F.R.S., O. W. RICHARDS, M.A., V. B. WIGGLESWORTH, M.A., B.Ch., M.D.

Election of Fellows.

The following were elected Fellows of the Society :—ASSAD DAOUD HANNA, 53, Fairholme Road, W. 14; GILMOUR DONALD IRVING, 7, Mapesbury Road, N.W. 2.

Exhibits.

A Curious Entomological Pill-box.

Dr. Wigglesworth described some of the methods used by uninstructed natives in West Africa for capturing insects, and exhibited an " entomological pill-box " consisting of an empty seed capsule plugged with a folded leaf.

Heteropterus (*Cyclopides*) *morpheus* from Angoulême.

Mr. Simes exhibited a series of the Hesperid butterfly *Heteropterus* (*Cyclopides*) *morpheus*, Pall., from the forest belt to the S.E. of Angoulême, Charente, France. He said that the butterfly was formerly supposed to be rare and to be obtained by kicking it up out of damp grass near woods. It is, however, more frequent than was supposed, and actually occurs in large numbers in certain districts in W. France and N. Italy, where it flies in bright sunshine. He found it in large numbers in the Angoulême district in the middle of June 1931. There are two points about the insect on which, so far as he was aware, nothing had been published. The first related to the insect's normal flight, which is extraordinary and quite characteristic. Whereas the general run of butterflies pursue their way more or less horizontally, this Skipper literally dances along just above the grass tops with an up and down movement, rising and falling about 1½ feet at each " step."

He knew of no other insect which flew like it, and he asked whether any other Fellow had observed the habit and could suggest any explanation of it and of the purpose which it served. The second point related to the coloration and marking of the underside and more particularly of the hind-wings. Observation of a very large number had convinced him that the underside pattern had been evolved definitely with reference to the inflorescence of the sedges amongst which the insect rests. The insects observed at rest were almost always perched in a horizontal position on the sedges, and the inner margins of the hind-wings, which seem to be particularly soft in texture, were nearly always somewhat curved, upwards and outwards, by the weight of the insect. This had the effect of reducing the wing area which could be seen from any given point and thus enhancing the similarity to a flowering head of sedge.

The Relationship between Courtship and Predacious Habits in *Dioctria rufipes*, De G., and *D. atricapilla*, Mg. (Dipt., ASILIDAE).

Mr. B. M. Hobby said that the observations of Prof. Poulton on the behaviour of the Spanish Asilid, *Selidopogon diadema*, F. (1906, *Trans. Ent. Soc. Lond.*, **1906** : 366–7), seemed to point to the conclusion that in this species courtship was fraught with grave danger to the male, and was on that account conducted with great caution. This view was supported by the fact that " three females with prey were seen to be persistently courted by males " and also by an instance of the female eating the male. Melin (1923, *Zool. Bidrag, Uppsala*, **8** : 216) records, however, that out of all the hundreds of pairings of the Swedish Asilidae that he has witnessed, on only one or two occasions was the female with prey. The fact that a paired female had prey was important, but the prey if absent may have been dropped before the observation was made, so that comparison between the two conditions was valueless. The exhibited specimens of *D. rufipes* and *D. atricapilla* were collected with the object of investigating the relationship between courtship and predacious habits in these two species.

Courtship in *Dioctria* has been described by Melin (*l.c.*, p. 212) and Richards (1927, *Biol. Rev.*, 2 : 316). The female sat in long grass; the male, humming on a high note, flew in front, some distance above her, always facing her and oscillating from side to side as though moving over the arc of a pendulum. Eventually the female flew off followed by the male, and the performance was repeated. Actual mating was not observed. Mr. Hobby said that on several occasions his attention had been attracted to a female resting more or less concealed among long grass, by first seeing a male behaving in this striking manner. In a similar instance Melin has suggested that the males could not have discovered the females by means of the sense of sight. If this be so, then the male on his first approach would be unaware whether or not the female was in possession of prey.

Although he had observed some thirty to forty instances of courtship, in only four instances was the female (all *D. rufipes*) with prey. On one other occasion a male *D. rufipes* was courting a female *D. atricapilla* which had prey. He had also caught 57 female *D. rufipes* and 4 female *D. atricapilla* with prey, all of which were unattended by males. Furthermore, he was unable to detect any difference in the behaviour of males towards females with or without prey.

Six pairs (4 *D. rufipes* and 2 *D. atricapilla*) were found *in copula*, but only on one occasion was the female (*D. atricapilla*) with prey. These pairs were apparently adopting the linear pose.

Females were found with prey about twice as frequently as males. About a third of these were Hymenoptera, but most of the remainder were Diptera. The latter included 6 ASILIDAE (*D. rufipes*, 3 ♂♂, 1 ♀ and *D. atricapilla*, 2 ♂♂)—all as prey of *D. rufipes* females. The fact that a female caught a female of its own species suggested that males also might be attacked and killed under similar circumstances. In other words, it did not follow that they were attacked during courtship. It was possible that the abundance of ASILIDAE in the local insect fauna might account for those cases in which they were themselves taken as prey. They would thus form part of a more general insect diet.

The exhibited specimens were collected in the University Parks at Oxford during June 1931 and are preserved in the Hope Department of the University Museum, Oxford.

The insect inhabitants of a Mediterranean beach.

Mr. O. W. RICHARDS said in early July 1931 a short visit was made to Aiguebelle, Dept. Var, France. During daily visits to a small sandy beach a number of interesting insects were found on the part of the strand actually washed by the waves.

The most unusual was the Evaniid, *Zeuxevania splendidula*, Costa. This species was described from Sardinia by Costa in 1884. Picard and Lavagne (1913, 1914) first discovered it in France, breeding it from the egg-cases of the cockroach *Loboptera decipiens*, Germ. Génieys (1924) made a detailed study of the larva and method of oviposition of the parasite. Hitherto it has been recorded mainly from wooded districts. The specimens exhibited were captured on wet sand and shingle, sometimes almost in the water. The cockroach-host was common on the same beach.

A number of other insects were also common in the same habitat, especially the remarkable Pentatomid bug, *Odontoscelis fuliginosa*, L., and the Histerid beetle, *Saprinus dimidiatus*, Ill. Hiding under driftwood was the peculiar cricket, *Mogoplistes squamiger*, Fisch., usually supposed to be rare and probably nocturnal in its habits. Other members of the same association were: Beetles, *Cryptophilus integer*, Heer (CRYPTOPHAGIDAE), *Dichillus minutus*, Sol. (TENEBRIONIDAE), *Anthicus genei*, Lef. (ANTHICIDAE), *Atelestus hemipterus*, Gr. (MALACHIIDAE), the Ichneumonid, *Phaenolobus nigripennis*, Gr., and the Pentatomid, *Brachypelta aterrima*, Fst.

The sea-cliffs are often one of the best collecting grounds for Aculeate Hymenoptera during the Mediterranean summer. Elsewhere water is difficult to come by, but here slight trickles of foul water often persist. Innumerable wasps visit these springs in order to drink. The assemblage consists partly of builders in mud, such as *Pison atrum*, Spin., *Sceliphron* spp., *Chalybion femoratum*, Fab., *Odynerus* spp. (subgenera *Ancistrocerus* and *Lionotus*), *Trypoxylon* spp., but also species which burrow in sand, especially *Tachysphex* spp. and species of *Miscophus*. The Psammocharids, which live on the hottest slopes do not appear to require water in the same way, though *Pseudagenia carbonaria*, Scop., which differs from its allies in making mud-cells, is often found. Social wasps, *Vespa* spp. and especially *Polistes gallica*, L., form the bulk of the visitors.

The thanks of the exhibitor were due to Mr. K. G. Blair for identifying the beetles mentioned.

A new form of *Acraea kraka*, Auriv.

Dr. G. D. HALE CARPENTER exhibited one male and three females of an *Acraea* taken by him on the Bwamba Pass on Mt. Ruwenzori, on the western border of Uganda, at an elevation of about 6500 ft. on January 14th, 1928. He said that he was unable to find any specimens like these in the Hope Collection at Oxford, and Mr. N. D. Riley had kindly stated that there were none in the National Collection; neither has the collection at Tring any similar specimens. Dr. H. Eltringham had very kindly made a preparation of the genitalia of the male specimen, and reported as follows. "The male armature resembles most closely that of *A. kraka*, Auriv.; indeed there is no other with which it can be compared except that of *unimaculata*, Gr. Sm., and the markings are so utterly different that it can scarcely be a form of *unimaculata*."

The similarity of the genitalia, and the position of the spots, leave no doubt that the Ruwenzori specimens are a form of *kraka*. They all differ from the type in the colouring of the basal portion of both wings which instead of being red is dull yellowish white. Both sexes agree in this. The spots are, as usual in *Acraea*, somewhat variable in size and intensity of colour, but in none of the specimens are they so well marked in area 1*b* of the fore-wing as in the figure given by Aurivillius of the type, a female (1893, *Ent. Tidskr.*, **14**: pl. 6, f. 3, and p. 272). In the male specimen only the proximal of these two spots is present, faintly shown; the distal one is absent.

This variety is here named **pallida** var. n. The chief point of interest about it is that it appears to be a true geographical race, separated from the type locality by a distance of well over a thousand miles.

The three females from which Aurivillius described the type were all taken at

Bibundi, Bonge, in the Kameruns. Six examples from Fernando Po island are in the National Collection, and there are two at Tring from the same locality.

It appears to be a rare species, and the capture of additional specimens is much needed to throw further light on the distribution which at present seems to be strikingly discontinuous.

A mimetic association of a Syrphid with a Xylocopid and a Scoliid.

Dr. G. D. Hale Carpenter exhibited examples of the following insects, taken at the same time on the same group of flowers at Medo in Portuguese East Africa lat. 13° S., long. 39° 15′ E., on 7th August, 1918 :—two specimens of the wood-boring bee, *Xylocopa senior*, Vachal, one specimen of the Scoliid, *Dielis collaris*, F., race *coelebs*, Sichel, and three specimens of the large Syrphid fly, *Protylocera* (*Senaspis*) *elliotti*, Aust. These insects have a black abdomen and dull yellow thorax, with dusky blue-black wings and black legs. While the resemblance between the two Hymenoptera is doubtless synaposematic, the fly may be a true Batesian mimic. Attention was drawn to this group by Sir Guy Marshall in 1902 ; his examples, which were captured in Mashonaland at Salisbury, were identified as *Podalirius acraënsis*, Fabr., *Anthophora basalis*, Smith, *Xylocopa olivacea*, Spin., *Xylocopa modesta*, Smith, *Dielis collaris* race *coelebs*, Sichel, and *Melittia* sp. (See 1902, *Trans. Ent. Soc. Lond.*, **1902** : 530, and Plate XXIII.)

Observations by R. A. Lever and H. W. Simmonds on male Euploeine butterflies attracted to the "Forget-me-not Tree," *Tournefortia argentea*, L., in Fiji. Correction of an erroneous inference.

Prof. Poulton said that his friend Mr. G. H. E. Hopkins had called his attention to a mistake which he had made in associating the gregarious sleeping habits of *Heliconius charithonia*, L., of both sexes, with those of the male Euploeas which cluster on *Tournefortia* (1931, *Proc. Ent. Soc. Lond.*, **6** : 9). The fact that both manifest "the same preference for dead or leafless twigs" had suggested the erroneous inference that the behaviour was of the same nature and had the same meaning. Mr. Hopkins had now kindly written from Kampala :—

"14 *October*, 1931.—The reference for which you ask as regards Euploeas sleeping in flocks is on p. 16 of my part of the *Insects of Samoa*,* and is as follows :—'It should be noted that this habit [of males attracted to *Tournefortia*] is quite distinct from that of roosting in flocks, which is so common in the genera *Euploea* and *Danaida*. In Tonga, in addition to seeing the males of *E. mathewi* on *Tournefortia*, I was able to find both sexes going to roost in the evening about half a mile inland; they did not appear to show a preference for any particular tree, and there were no specimens of *Tournefortia* in the neighbourhood, this tree being entirely confined to the beach.'

"The whole affair is very strongly impressed on my memory because the roosting-place at roosting-time, was the only spot where I could reckon on getting decent numbers of females. I feel sure that I observed a similar phenomenon with *E. schmeltzi*, but did not note it at the time, and have, therefore, not published it. I have no record of the proportions of the sexes in the record mentioned above, but remember perfectly that the proportion of females was not very low—not much below 30%, for instance. I thought that this habit of both sexes roosting together in flocks was well known and therefore did not pay much attention to it. The males could be found on *Tournefortia* at any time in the day, not just in the evening."

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* 1927, *Insects of Samoa, &c.*, Brit. Mus. (Nat. Hist.), Pt. III. Fasc. 1. Lepidoptera.

Having unduly neglected Mr. Hopkins' interesting and valuable discussion of the remarkable behaviour of the male Euploeas, the speaker now wished to quote the remainder of the passage describing how the author " once saw many hundreds of *Euploea schmeltzi* on the fruit-clusters of *T. argentea* in Savai'i [W. Samoa], but even in this case it was the dead and withered clusters that were preferred. The tree does not seem to be attractive to any other butterflies, except moderately so to males of *D. m. melittula*, and it is difficult to imagine in what the attraction lies; no exudation of any sort was observed. Since the attraction is almost confined to males of the genus *Euploea*, it seems not impossible that the scent may resemble that of a virgin female, and that the volume of it is sufficiently great to make up for slight differences, and hence make it attractive, not to one species of *Euploea* only, but to many " (*ibid.*, p. 16).* It might be added that the occasional presence of male Danaines, closely related to the Euploeines, may be capable of the same explanation. *Danaida melittula* mentioned above by Mr. Hopkins, was one example, while another, *D. m. neptunia,* observed by Mr. H. W. Simmonds, was recorded on p. 79 of this communication.

It was satisfactory that in accepting Mr. Hopkins' correction and withdrawing the suggestion the speaker had made concerning the males attracted to *Tournefortia* in 1926, *Proc. Ent. Soc. Lond.*, **1** : 48; **5** : 48; **6** : 9, it was possible to add the following new and interesting examples of the same behaviour in Fiji :—

Mr. R. A. Lever, F.E.S., who had been spending April 1931 in the Lau or Eastern Group of the Fijian Islands and had kindly sent him many very interesting butterflies † from Vanua Balavu, and Munia, a small island to the south of it, had written, on May 23, concerning the Euploeas and *Tournefortia* :—

" The males have a marked partiality for the tree *Tournefortia argentea.* I never took one female from this tree, though the males flew up in dozens when the branches were struck. The smell of the male scent-glands I think can best be described as like that of burnt ginger-bread or caramelised toffee!"*

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* The above hypothesis was also suggested by Mr. Hopkins in 1926, *Proc. Ent. Soc. Lond.*, **1** : 35, where many examples of males attracted to *Tournefortia* are given by the author and Dr. P. A. Buxton. The Euploeas of four species taken by Dr. Buxton from the same dead twig of this tree, on Tanna I., New Hebrides, are recorded under the dates 22, 23, and 24 September, 1925, of the table (*ibid.*, p. 49). It should be noted that, of the two records dated 23 September, the one which includes seven males is stated to have come from the same dead twig.

Dr. Buxton agrees that it must not be assumed that the eight male Euploeas dated 23 September, 1925, were taken from the " dead twig " bearing the other seven males of the same date. He has also kindly written confirming the conclusion that the " flowering tree " which bore the dead twig was *Tournefortia argentea.*

In addition to the examples mentioned by Mr. Hopkins (*ibid.*, p. 35) he also quotes in *Insects of Samoa, &c.*, p. 16, C. M. Woodford's observations in the Solomon Islands (*A Naturalist among the Head-hunters,* London, 1890, p. 94). This author does not mention the sex of the black Euploeas which he describes as " flying in a crowd round " *Tournefortia.* " A branch is broken," he continues, " and the leaves are hanging dry and wilted. The butterflies settle on the dead leaves in swarms, almost pushing and jostling one another to get a good place. Notice that it is the withered leaves and flowers that they prefer, and seem to become half-stupid in their eagerness to extract the peculiar sweetness, or whatever it is, that the leaves contain."

† These specimens together with Mr. Lever's valuable notes will be brought before the Society at a future meeting. It would be very interesting to know how far the male scent is similar in the four species of *Euploea* represented in this E. Fijian collection.

Mr. Hubert W. Simmonds, to whom we owed so much for our knowledge of Fijian butterflies, had written of the same subject from Suva :—

"8 *August*, 1931.—I recently visited the island of Koro for an hour, and there saw several of those assemblages of Euploeas which have been recorded by Paine † and Buxton. They were all on shoots, containing one or more dead or damaged leaves, of the 'Forget-me-not Tree' (*Tournefortia argentea*, Linn.), upon which the 'Speckled Footman' moth feeds. The interesting point was that all four species were present, *E. boisduvalii proserpina* being most abundant. I am not quite sure about *eleutho* (*helcita*), which was scarce, but *proserpina* and the other race of *boisduvalii* which you named *simmondsi* [*mangoensis*, Butl.], *macleayi*, and the one with the purple sheen [*forsteri*, Feld.], were present; also the greenish *Danaida melissa neptunia*. I am sending you one cluster taken in two strokes of the net. They are in one paper, as I had no chance to pack them properly. The finding of *simmondsi* was a surprise, as Koro lies well to the westwards of its range and both *simmondsi* and *proserpina* were present." ‡

The twenty-three male specimens sent by Mr. Simmonds and exhibited to the meeting included, 1 *Danaida melissa*, intermediate between *neptunia* and *protoneptunia*; 1 *Euploea nemertes macleayi*, of E. Fijian type with reduced pattern; 21 *E. boisduvali*, of which two were *mangoensis* (*simmondsi*) with rather unusual development of H.W. pattern, 19 transitional towards *proserpina*, and only two full *proserpina*. The E. Fijian facies of these Euploeas was probably due to preservation of the ancestral pattern on this isolated island (Lat. 17° 20′ S.; Long. 179° 25′ E.), where, moreover, *Euploea eleutho* (*helcita*) did not appear to be abundant.

To return to *Tournefortia argentea*, L. fil. (Boraginaceae), he had not been able to learn from botanical friends that it possesses any known quality which would explain the attractiveness to male Euploeas. Prof. A. G. Tansley, F.R.S., had informed him that it was a small tree, 10 to 12 feet high, having twigs with a silky pubescence, flowers white and faintly scented, but unspecialised for Lepidopterous visitors. Dr. A. D. Cotton of Kew had also been unable to find anything about the plant which would serve to throw light on the attraction, and concluded that it was "a problem for the field biologist on the spot."

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* Since these notes were printed a letter, written 23 October 1931, has been received from Mr. Lever in Tulagi, Solomon Islands. The following extracts refer to the above communication :—

"The male Euploeas I noticed particularly in Munia and found them to settle on the withered branches of *Tournefortia* which remain on the tree long after they are quite dry and brittle. I must confess I did not notice if they fed on anything on the trees but hope to rectify this omission here.

"The epigamic scent most assuredly came from the anal brushes. As far as I remember the smell was present in all the species I took. I feel I ought to qualify my remark about the source of the scent by saying that if it is possible for it to be present on both the wings and brushes, then the Fijian species may have had it on the former too. But it was only noticeable on the anal brushes, being in fact very apparent."

† I have not been able to find this record.—E. B. P.

‡ Mr. Simmonds again wrote, 31 October 1931, from Suva :—"This was the first time I had seen one of these assemblages in Fiji, but I had observed them on Epi in the New Hebrides. In that observation I only remember one species. In this I was so struck by the fact that there were 5 species involved. Paine also saw these assemblages on Koro."

It was to be hoped that the experiments suggested on p. 48 of the 1926 *Proceedings* would be undertaken, dead twigs, branches and leaves being removed and attached to other trees and other parts of the same tree. Dr. F. Morton Jones' results with *Heliconius charithonia*, L.,* encouraged the hope of a successful result, as also the fact that Dr. Armstrong once saw about 150 *Euploea schmeltzi* "on one dead branch below the tree, all males" (*Butterflies of Samoa*, p. 15). The detached fragments should be subject to various conditions—sun and shade, fixed to *Tournefortia* and other trees and shrubs, also to bare stakes, left lying on the open ground and amid herbage, and at varying distances from spots where the Euploeas are plentiful. Living parts of the tree in the same positions would serve as controls, and if watched from day to day might provide evidence of the appearance and increase of the attractive principle. Bruising the living portions of the tree which are to be exposed might hasten or increase the effect and perhaps enable us to discover the parts or tissues which, when decayed, are most attractive and could be most hopefully investigated by the chemist.

Observations on the Hummingbird Hawkmoth, *Macroglossa stellatarum*, L., attracted by the representations of flowers.

Prof. Poulton said that Mr. G. Fox-Wilson had kindly sent him the following references to this interesting subject, additional to those which had been quoted in 1930, *Proc. Ent. Soc. Lond.*, **5** : 63, 64; 1931, **6** : 3, 4.† They were given in a Carnegie Institute Memoir, 1923, "Experimental Pollination : An Outline of the Ecology of Flowers and Insects," by Clements and Long.

(1) R. Vallete (1875), Ann. Soc. ent. Belg., **18** : xxviii.
(2) R. Vallete (1879), *ibid.*, **21** : lxvii.
(3) F. M. Burton (1878), Nature, **17** : 162.
(4) L. Errera (1878), Bull. Soc. Roy. bot. Belg., **12** : 102 (quoting Strasburger).
(5) R. Blanchard (1891) Bull. Soc. zool. Fr., **16** : 23, 205.
(6) J. Wery (1904), Bull. Acad. Roy. Belg., p. 1211.
(7) F. Plateau (1906), Mem. Soc. ent. Belg., **12** : 141, 176.
(8) F. Knoll (1922), Insekten und Blumen, Heft 2, Abh. zool.bot. Ges. Wien, **12** : 125.

The wasp model of a Colombian Syntomid moth.

Prof. Poulton said that Dr. George Salt had now received and had kindly communicated to him the name of the fairly common wasp which is the model of

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* 1930, *Natural History, J. Amer. Mus. Nat. Hist.*, **30** : 635. Abstract in 1931, *Proc. Ent. Soc. Lond.*, **6** : 4.

† Dr. P. A. Buxton, remembering an interesting observation made some years ago by his father Mr. A. F. Buxton, had kindly written to him for his recollections, now recorded below :—

"I saw a Hummingbird Hawkmoth at Vezelay, France. There was a building, whitewashed inside, with a large door open. The sun shone on the opposite wall, inside, on which was one solitary bright blue tile—very bright in the sun. When the moth flew in he went straight to it, and hovered about it a few moments; and then (finding nothing to suck in it, I suppose) flew straight out again. He had clearly come in only because he saw something bright and would explore it.—A. F. B."

Pseudosphex sp.? *klagesii*, Rothsch., exhibited to the Society 4 March, 1931 (1931, *Proc. Ent. Soc. Lond.*, 6: 21). Dr. J. Bequaert had determined it as *Polybia chrysothorax*, Weber.

Observations by Oswald H. Latter on the insect enemies of the British bee, *Osmia rufa*, L.

Prof. Poulton communicated the following observations made by his old friend Mr. Latter, who was unable to be present. The insect enemies referred to in the notes were also exhibited.

"8 *November*, 1931.—Last year an *Osmia rufa* constructed 19 cells between the bottom of the sash of one of my windows and the window sill. (I arranged that this window should not be opened at the bottom, when I had discovered the bee at work.) On August 5th I carefully raised the window sash and transferred the cells and their contents to a number of glass tubes. Only 4 of the cells appeared then to be sound. The remainder were damaged by two beetle larvae and their lawful tenants were being, or had been already, devoured by these or by numerous Dipterous larvae. In the course of the summer of 1931 it became clear that only 2 of the 4 apparently sound cell-contents were really so, and from these emerged 1 ♂ and 1 ♀ *Osmia* respectively. The beetles proved on emergence to be *Megatoma undata*, Er. (Champion named some for me years ago, so I am sure of the sp.) The flies were very numerous; I have not counted them, and am not sure of the species, but I see in one of my books that *Cacoxenus indagator*, Lw., attacks another sp. of *Osmia*, so it may be that.* No doubt parasites often take even heavier toll of broods, but in this case they left the *Osmia* population of 1931 exactly equal to that of 1930."

Diptera (MILICHIIDAE) bred from the nest of the bee *Anthophora pilipes*, F., by A. H. Hamm.

Prof. Poulton communicated Mr. Hamm's interesting note on the larvae of *Cacoxenus indagator*, Lw., and exhibited six of these flies with their cases, five dead in their cases, and the thread-like excreta; also a photograph of the living larvae lying in the tangled mass.

"At the end of June or early in July 1910, I received from my friend Dr. G. Arnold about a dozen Dipterous larvae which he had taken from a nest of the common Mason Bee *Anthophora pilipes*, F., at Budleigh Salterton, Devon. The larvae refused to feed and were evidently full-grown when I received them. They were kept under observation at frequent intervals until they pupated—between 28 April and 7 May, the flies emerging 24–28 May, 1911. The larvae, during their quiescent, prepupational period, continued at intervals to extrude brownish thread-like excreta which collected to form an irregular sheet over the glass floor of their little cage, which was completed by an inverted watchglass. However often they were disturbed, the larvae invariably rearranged themselves in the same way—side by side in superposed rows with their heads facing the same way and as close as possible to the edge of the glass cover. Each larva of an upper row lay between two larvae of the row below, so that the rows became successively shorter. Thus a common arrangement would be five in the lowest row, then four in the second and three in the topmost, the effect being very peculiar and characteristic. The larvae did not preserve this arrangement but separated for pupation. The flies were determined by Mr. J. E. Collin as *Cacoxenus indagator*, Lw. (Milichiidae).—A. H. H."

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* Dr. F. W. Edwards kindly compared Mr. Latter's 17 specimens with others determined by Mr. J. E. Collin (p. 82), and found them to be of the same species, viz. *C. indagator*.

Hive-bees occupying a hole in a Chestnut tree in which a Jackdaw was nesting.

Prof. Poulton said that the Registrar had kindly called his attention to the observations recorded by R. J. Flintoff in *The Naturalist* for 1 November, 1931, p. 350. The writer was, on 2 July, 1931, shown by James Green a chestnut tree with a hole in it about 40 ft. from the ground, in Nursery Wood, Thornton Dale, No. 2 Rookery. Hive-bees were entering and issuing from the hole and flying round it. A Jackdaw flew in and after a moment or two emerged. It repeated this operation and " was obviously feeding young. . . . It seems a reasonable assumption to make that a pair of Jackdaws and a stock of bees had a home in the hole in the tree. A week later, Green saw young Jackdaws in the tree. The same thing happened last year, both bees and Jackdaws using the hole at the same time. Last winter when the Jackdaws paid one of their visits, they threw out empty cakes of honeycomb. These were found on the ground just below the hole."

J. Green also stated that " some years ago, a Green Woodpecker's nest was entered by a swarm of bees. The old birds made a great commotion and disappeared. They were not seen again, and after a little while the bees also left the tree. He concluded the young birds had decomposed, and the stench had driven the bees away."

The former observations on Jackdaws and bees probably helped us to understand the beginning of associations between birds and Aculeates recently described in our *Proceedings*.

Wallace and Bates on the Amazon.

Prof. Poulton said that the opinion had been held—he had heard it expressed by one of our most distinguished Fellows, in the old days at Chandos Street—that it was in consequence of some disagreement that these illustrious naturalists, soon after their arrival at Pará in May 1848, separated and explored different parts of the great river system. He had strongly contested this opinion * which was refuted by Wallace's own account of his travels. Within the last few weeks he had been greatly interested by the confirmation afforded by two of Bates' letters kindly lent to him by Mr. W. G. Wallace. The first of these, dated 13 June, 1851, from Pará, is a very kindly and sympathetic letter written to Mrs. Wallace, with the sad intelligence of the illness and death, on June 8, of her son Herbert, Wallace's younger brother, who had joined him on the Amazon and died of yellow fever at Pará on the eve of his departure for England. It was evident that Bates did everything that was possible for Herbert during the illness, which he himself also contracted.

The second letter, also of considerable length, was written in the same kindly spirit, 18 October, 1851, for the information of Herbert's aunt Mrs. Sims. " Send both Mr. Bates' letters to Alfred" is written in pencil, probably by Mrs. Wallace, at the end of this letter which also contains the following interesting reference to Wallace, who was on the point of returning from his first expedition up the Rio Negro and the unknown Uaúpés :—

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* 1923, *Proc. Roy. Soc.*, B, **95** : x, xi.

"I think no one knew where he was residing and many months have passed since he wrote to Pará. I have just heard, however, that he is expected daily at the Barra [the modern Manaos] of the Rio Negro with a very rich collection and I intend to write him by the first canoe that leaves for that place."

The collection referred to was, with others, destroyed when Wallace's ship caught fire and was abandoned, on the voyage home, in August 1852.

The speaker felt sure that these few intimate details concerning the lives of two of the greatest among our past Fellows would be gladly received by the Fellows of to-day.

On the dates of publication and contents of the parts of *Westwood* (*J. O.*). *Introduction to the Modern classification of Insects*, 1838–1840.

Prof. POULTON said that he had received the following notes by Mr. F. J. Griffin, the Registrar of the Society.

"I recently discovered whilst referring to the Minute Books of the Society that Westwood's *Introduction* appeared not in two volumes as is generally believed, but in a number of parts issued at intervals. I did not publish the results I then obtained, as the records were not quite complete and I hoped to be able in some way to reach finality before publication; this I am pleased to say is now possible owing to the kindness of Prof. Poulton. It is well known that Westwood was the first 'Hope Professor' and that his Library is under the charge of that department. Whilst at Oxford recently, I discovered Westwood's own copy of his work with the wrappers still in existence and manuscript notes of the contents in Westwood's handwriting. Printed on the wrappers is the date of publication for the month and year only, but from the information in the Society's Minute Books, it is quite apparent that publication was made very early in the month if not actually on the 1st. Westwood was in the habit, it appears, of bringing the current part of his *Introduction* to the Meetings of the Entomological Society and presenting a copy to the Library, and it is the record of this gift which fixes the date conclusively. It will be noticed that in a few cases the Society was very late in receiving their part, so that in these cases no date other than the month can be fixed from the records. I am much indebted to Prof. Poulton for his assistance.

Part.	Pages.	Sheets of Synopsis.	Date on Wrapper.	Date of receipt by the Ent. Soc. London.
Vol. 1.				
I.	1–48	B	May 1838	7.v.1838
II.	49–112		June 1838	4.vi.1838
III.	113–160	C	July 1838	8.viii.1838
IV.	161–224		Aug. 1838	7.x.1839
V.	225–288		Sept. 1838	3.viii.1840
VI.	289–352		Oct. 1838	1.x.1838
VII.	353–400	D	Nov. 1838	5.xi.1838
VIII.	401–462		Dec. 1838	3.xii.1838

Part.	Pages.	Sheets of Synopsis.	Date on Wrapper.	Date of receipt by the Ent. Soc. London.
Vol. 2.				
IX.	1–128		Jan. 1839	4.iii.1839
X.	129–192		Feb. 1839	4.ii.1839
XI.	193–224		Mar. 1839	4.iii.1839
XII.	225–256		Apr. 1839	6.v.1839
XIII.	257–288	E, F	June 1839	3.vi.1839
XIV.	289–352		Nov. 1839	2.xii.1839
XV.	353–400	G	Jan. 1840	6.i.1840
XVI.	401–587	H–L	June 1840	1.vi.1840."

Prof. Poulton said he was sure that this information on the appearance of Westwood's great work would be welcomed by the Fellows. He well remembered how his old teacher and friend told him with glee that the *Introduction* was known in America as "The Entomologist's Bible"; also that Charles Darwin had, on the evidence supplied by these two volumes, supported the claims of the author to a Royal Medal, awarded to him by the Royal Society in 1855.

Mr. K. Mellanby, a visitor, made remarks, illustrated by lantern slides, on the death of insects at high temperatures in dry and in moist air.

Wednesday, December 2nd, 1931.

Mr. H. Willoughby Ellis, Vice-President, in the Chair.

Nominations.

The Secretary read for the second time the nominations of the Council for Officers and Council for 1932.

Election of Fellows.

The following was elected a Fellow of the Society:—Ewen Cameron, B.Sc., Farnham House Laboratory, Farnham Royal.

Report on Wicken Fen.

The Secretary read the following report received from Messrs. E. C. Bedwell and H. M. Edelsten, the Society's representatives on the Wicken Fen Committee.

We were appointed by this Society in 1926 to represent them on the Local Committee of Management of Wicken Fen. Either both, or one of us, have attended the annual meeting of the Committee held at Cambridge in July each year.

At the time of our appointment Wicken Sedge Fen was fast becoming an impenetrable thicket. The work of cutting had been brought to a standstill during the Great War and there was no market for sedge or reed, consequently there was no income, except from donations, and these were, and still are, quite inadequate for the work required to restore the Fen to its former state.

Parts of the Fen had been neglected for years, many plots were covered with dense bush comprising buckthorn, sallow and Guelder-rose, and the National

Trust were faced with the serious problem as to how to treat these overgrown portions.

Many interests are, of course, represented on the Management Committee, and there are no doubt some who find it difficult to realise that Wicken Fen is not an ordinary Nature Reserve or Bird Sanctuary which can be left in a natural state, but a highly specialised area containing a wealth of insect and plant life that must be given sun and air to enable it to exist.

Considering the smallness of the funds available, and heavy drainage rate, progress has been made thanks to the enthusiasm and devotion of Professor Stanley Gardiner, F.R.S., but a good deal still remains to be done.

A new drove has been cut from east to west between the main drove and Wicken Lode continuing beyond Drainer's Dyke, and cross droves joining the two droves and running out to Wicken Lode have been made. A fire raged in a portion of the Sedge Fen two years ago, and in our opinion this was a blessing in disguise, making the clearing of a very congested overgrown area less difficult.

When we first knew Wicken Fen, now some forty years ago, it was divided up in numbered plots held by numerous owners, but between 1890–1900, owing to rumours that the Sedge Fen was to be drained, various people interested in the preservation of our fauna and flora purchased available portions, the National Trust acquiring their first portion in 1899. The late Mr. Verrall, a Fellow of this Society, became the largest owner and bequeathed on his death about 240 acres to the National Trust.

As the demand for the produce of the Fen diminished, many of the owners disposed of their holdings to the National Trust by sale or gift. From time to time the Trust also acquired large areas of land adjacent to the Fen.

In earlier days the Fen was very much more heavily mown than it is at present, consequently the fauna and flora was more plentiful. The various owners cut their portions at varying times according to the demand for the crop of sedge or litter, as the case might be. Sedge for thatching was cut every fourth or fifth year, while litter was mown in June, July and August annually, or every other year, so that it was always possible during the summer to find some flowery ground open to the sun and air and consequently attractive to insect life, and this is the state we desire to see restored.

Leaving out of the question the financial position, we think every effort should be made to do more cutting and that a regular rotation should be inaugurated. The present system is to cut during the winter, but we should like to see some areas of litter cut during the summer months, and this would tend to check the ever spreading growth of reed. Winter and spring cut portions remain fairly open up to about the middle or end of June, after that the growth becomes denser, so that towards the end of July collecting is practically confined to the main drove.

More space should be made available for the study of the Fauna and Flora. For instance, at the time of the annual visit of the Local Committee in July this year a narrow pathway had been mown up one side of the new droves to enable visitors to *walk* and to show where the droves *were*, the unmown portions being about 3 feet high. By the end of July and early August it would be quite impossible to do any serious entomological work on the droves. We consider that if the droves are mown at the end of June or early in July it would check the reed and create in the course of two or three seasons a "litter association" which we feel is the most suitable for them. On either side of the droves we have all the reed and sedge communities, therefore there is no object in the droves being overgrown with a similar association.

In a neighbouring Fen we have repeatedly noticed that where portions are mown during the first week in July, more open conditions prevail the following summer—luxuriant plant growth and abundance of flowers and therefore better conditions for insects.

We should much like to see some experimental mowing carried out at Wicken, portions of the different plant communities might be mown at different times (winter and/or summer) spread over say four years; this would give valuable data as to the resultant effect on both insects and plants.

In conclusion we would like to say how much we agree with Messrs. Godwin & Tansley's remarks (*Nat. Hist. Wicken Fen*, Pt. V, p. 439): "Unless the cutting is kept up, the mixed sedge and litter will all become quickly colonised by bushes, and as the Fen passes by rapid stages to 'carr' most of the characteristic fen flora and fauna will disappear. A rigid preservation of the Fen 'in its natural state,' with no cutting of vegetation or clearing of lodes and drains, is the quickest way to exterminate most of the species it is desired to conserve. Expressed in terms of developmental or genetic ecology it is essential to keep in being areas representative of every phase of the primary, secondary and deflected successions in order to maintain the greatest variety of fen species, both of plants and animals, inhabiting, as they do, different successional communities."

November, 1931.

Exhibits.

Mr. A. G. B. Russell exhibited and made remarks on a collection of moths all taken at light at Swanage during the autumn, including *Epunda lichenea*, *Aporophyla australis* and *Leucania unipuncta*.

Series of British Noctuids.

Mr. H. J. Turner, on behalf of Mr. A. J. Wightman, exhibited selected series of British Noctuids to show extreme forms rather than forms in sequence. They comprised :—

Taeniocampa gracilis.—The red form from the New Forest in different shades, even resembling *T. stabilis*; the Sussex form (Pulborough), which is much lighter with a basis of yellow, some having a red flush but not the red of the New Forest form.

Agrotis ripae.—From one locality in Sussex, from a form showing a minimum of marking to another having much resemblance to *A. vestigialis*. *A. cinerea.*—Females from E. Sussex, nearly all exceptionally dark. *A. vestigialis.*—From S. Hants, exhibiting variation in small points but none very distinctive.

Aporophyla lutulenta.—The beautifully marked and banded form, from Hoy and the I. of Man; the Sussex form, quite a different, darker grey with a tendency to be unicolorous.

Xanthia aurago.—A short series with 12 shades of colour of the inner and outer areas and 10 shades of colour of the central bands, from Sussex. *X. fulvago.*—Two distinct shades of ground-colour, from Sussex; all of large size, captured at night as they crept up to dry their wings.

Heliothis peltigera.—Bred, from Dungeness, showing many shades of colour in markings.

Nonagria arundinis (*typhae*).—Bred, the paler more typical forms from Pulborough and the deep reddish-brown almost black form (*fraterna*) from Norfolk. *N. cannae* (*algae*).—Norfolk: 5 distinct colour forms. *N. sparganii.*—The 5 Sussex colour forms, with varied forms of markings. *N. neurica.*—The species which so long evaded British collectors; quite easily recognised, the transverse white crest being unique, from Sussex. *N. dissoluta.*—Forms of the species which was confused with the last for so many years, from Yorkshire.

Senta maritima.—Sussex. Two remarkable examples of the form *wismariensis.*

Leucania straminea.—The varied Sussex forms. *L. turca.*—The yellow typical form, the ab. *lutescens* and ab. *immaculata.*

Dianthoecia barrettii.—S. Devon and Cornwall. *D. conspersa.*—The black and white variegated banded form from Sussex and Kent and the uniform brownish black form from Shetland.

Other species exhibited were *D. albimacula* from Kent, *D. carpophaga* from the South Coast, and *Hecatera serena*, *Eremobia ochroleuca* and *Orrhoedia ligula*, all from E. Sussex.

Local abundance as a factor governing prey-selection by predacious insects.

Mr. B. M. HOBBY said that some predacious insects have specialised habits, and persistently attack certain species or groups of species. The food of other forms is more generalised and is influenced by the abundance of particular insects in the local fauna, sometimes showing considerable variation from district to district and from year to year.

The exhibited series of TACHINIDAE (*Eriothrix rufomaculata*, De G., 3 ♂♂, 37 ♀♀) was obtained during September, 1930, as prey of the Fossorial wasp *Mellinus arvensis*, L., at Bitterne Park, Southampton. In this locality, *E. rufomaculata* occurred in great numbers on umbelliferous flowers, but at Longdown, New Forest, it was rarely seen and never taken as prey. Only one other instance of *E. rufomaculata* as prey of *Mellinus* has been recorded (Hamm and Richards, 1926, *Trans. Ent. Soc. Lond.*, **74**: 122).

The BIBIONIDAE (*Dilophus femoratus*, Mg., 28 ♂♂) were the prey of *Empis tessellata*, F., taken on 31 May, 1931, at Lye Hill, Oxford, where both insects were very abundant on flowers and along hawthorn hedgerows.

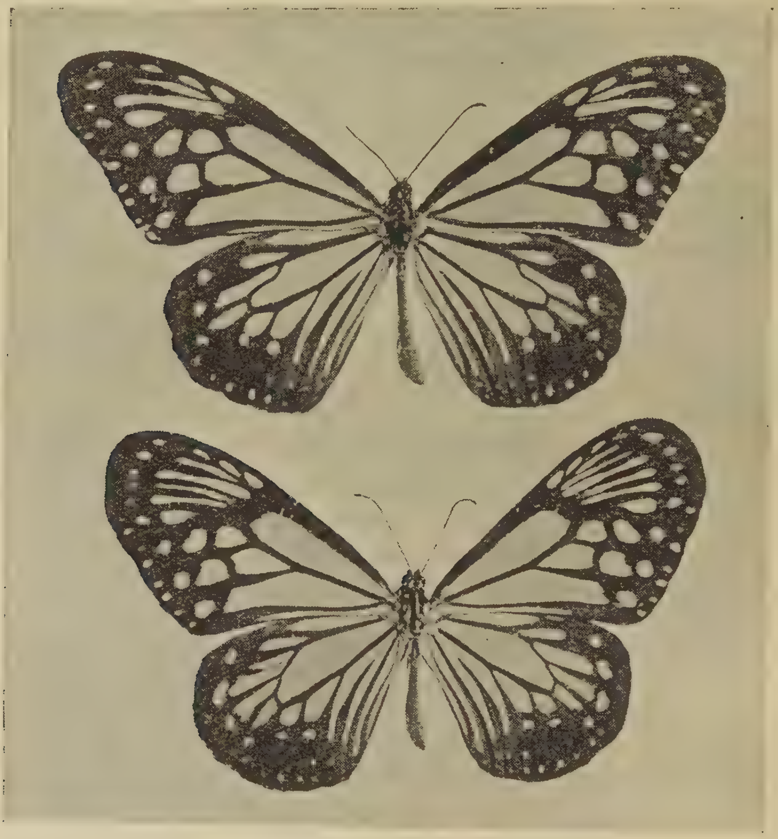
The series of the Cordylurid, *Scatophaga scybalaria*, L., with *Simulium equinum*, L. (29 ♂♂, 8 ♀♀), as prey, was obtained from a willow-tree overhanging a river and sheltering a swarm of *Simulium.* The dung-fly was able to deal with larger and more powerful insects (e.g. *Lucilia*), and there was little doubt that in other localities the prey would be of a more general nature (Hobby, 1931, *Proc. Ent. Soc. Lond.*, **6**: 48).

The Empid (*Empis trigramma*, Mg., 1 ♂, 10 ♀♀, 2 sex indet.), prey of the Asilid, *Dioctria rufipes*, De G., were from the University Parks, Oxford, at a time (4–12 June, 1931) when *E. trigramma* was very common among nettles and other low plants.

Only one other instance of Empid prey has been recorded for this species (Hobby, 1930, *Trans. Ent. Soc. S. Eng.*, **6** : 20).

Normal and teratological females of *Danaida melaneus*, Cram., from Sikkim.

Dr. KARL JORDAN exhibited two Sikkimese females of *Danaida melaneus*, Cram., 1775, one normal and the other teratological, and said that the abnormal specimen illustrated strikingly the well-known influence of the neuration on the wing-pattern : all four wings having additional veins, the number of markings being correspondingly increased. In the right fore-wing there were between the cell and the wing-apex five semitransparent streaks instead of the normal two, and on the left fore-wing four, the right wing bearing three additional radials and the left two. Both fore-wings were considerably shortened, the right one rather more so than the left. In the hind-wings the cell was distally much broader than in normal specimens, the long cross-vein not being incurved. This was probably due to the presence of an additional radial arising from this cross-vein between veins 5 and 6 (according to Herrich-Schäffer's system). Around the apex of the cell there were six instead of



Normal and teratological females of *Danaida melaneus.*

five spots. Moreover, in the left hind-wing the middle half of vein 5 was split, forming an elongate ellipse, and below vein 7 there arose from the cell another additional vein which joined vein 7 halfway to the termen. The terminal and subterminal dots were likewise increased in number where the additional veins reached to the termen.

A new species of *Abantis* from the Cameroons.

Dr. K. Jordan also exhibited several species of the African Hesperid genus *Abantis*, Hopff., 1875, many of which are remarkable for their beautiful coloration. They are known to be very fast fliers and to settle with the wings spread out or at least half open. The Hesperids recorded as showing close resemblance in colouring to members of other families of Lepidoptera being comparatively few, it is interesting to note that G. L. Bates discovered in the Cameroons a species of *Abantis* which fits remarkably well into the mimetic assemblage of which *Danaida chrysippus* is the colour-type. It agrees best with the female of *Euptera crowleyi*, Kirby, 1889. Dr. Jordan said that he named the new species **Abantis eltringhami,** sp.n., in recognition of the value of the book on *African Mimetic Butterflies* published by the President some twenty years ago, and gave the following description :—

Abantis eltringhami, sp. n.

Head, palpus and thorax black, spotted with white, margin of pronotum and apex of patagium orange; abdomen with a broad orange lateral stripe which extends on to the metathorax, on underside a white stripe flanked by a black one; underside of mid and hind tibiae and the long hair on anterior surface of all coxae white, hair on upperside of mid and hind tibiae orange. Both wings orange. On fore-wing this colour extends at costa halfway to apex and at posterior margin remains about 2 mm. short of tornus, the distal margin of the area nearly straight, slightly indented at the veins, apical area black, bearing an oblique band of 4 white spots from fourth subcostal to third radial, the spots being about 1·5 mm. long, below the band a rhomboidal submarginal white spot between the two median veins, extreme base black, with a white dot below cell, costal margin very narrowly black along orange area. Hind-wing with the terminal and abdominal margins narrowly black, the border somewhat wider around anal angle; fringe black in both wings.—Underside like upper, the orange colour rather paler, on fore-wing a minute white dot in apex of cell, and in front of the band another minute spot; in hind-wing the lower median and the submedian distinctly black, while on the upperside the black scaling on these veins is more or less completely concealed by orange scales and hairs.—Length of fore-wing: 18 mm., width 9 mm.—One male from Cameroons: Bitye, Ja River, 2000 ft., January–March, 1907, dry season (*G. L. Bates*).

Ronalds' Collection and the "Fly-Fisher's Entomology."

Mr. M. E. Mosely exhibited and made remarks upon the Ronalds' Collection used for the hand-coloured plates and figures in the "Fly-Fisher's Entomology" published some hundred years ago.

The collection is now in the Hope Department, University Museum, Oxford, a full account of it having appeared in 1930, *Ent. Mon. Mag.*, 66 : 116–123.

Doubts about the frequency of bird-attacks upon butterflies, and about the qualities believed to be advertised by warning colours.

Prof. Poulton said that he had recently read some comments on bird-attacks in *A year of Costa Rican Natural History*, by A. S. & P. P. Calvert (Macmillan, New York, 1917). Thus, on pp. 64, 65, the authors stated that the only occasion on which they saw a bird feeding on Lepidoptera was once, 18 May, 1909, when the prey was a Sphingid moth resting on the ground.

"We went to Costa Rica," they wrote on p. 65, "very favourably disposed towards the theories of mimicry and of protective resemblance. We expected to see many instances of birds pursuing and feeding upon butterflies, and frequently looked for such, but were utterly unsuccessful. Our experience in this respect entirely coincides with that of Mr. William Schaus in his three years in Costa Rica."

It was to be hoped that other naturalists visiting Costa Rica would bear these experiences in mind and also remember to look out for the indirect evidences of bird-attack.

The authors of this interesting work also record an attempt to test the warning scent of the Danaine butterfly *Lycorea atergatis*, Dbl.-Hew. At first they could smell nothing, but later on detected in the anal brushes of the male "a distinct odor resembling cedar shavings" (*ibid.*, pp. 76–78, 100). This latter scent, emanating from the male secondary sexual organs, was clearly epigamic and belonged to the same category as the aromatic-snuff-like odour detected by Lamborn in the brushes of a male African Danaine (1918, *Proc. Ent. Soc. Lond.*, **1918**: clxxii), and the scent recorded in these *Proceedings* on 18 November, 1931, by R. A. Lever, as given off by the brushes of male Fijian Euploeas (p. 79).

Mr. R. B. Benson had also kindly directed his attention to the following note on the insect-food of the skylark by T. A. Coward in *The Birds of the British Isles*, Ser. 1, p. 94: "Insects, especially small beetles, are largely eaten in summer; I have seen a bird catch and dismember a gold-tail moth, whose sluggish movements and showy whites are supposed to act as a warning, though experiment has proved that the moth is not distasteful."

The gold-tail moth *Porthesia similis*, Fues. (*auriflua*, F.) was certainly far less unpalatable than the Satin Moth (*Stilpnotia salicis*, L.) and the resemblance between the two has been known to protect the former from attack by a captive Marmoset (*Colours of Animals*, London, 1890, pp. 241–3). Nevertheless, further experiments and observations were required before a definite acceptance of the conclusion that the gold-tail is palatable to insectivorous vertebrates generally. It appeared significant that not a single example of this species was present in the list of 1328 moths named from the wings rejected by British bats (1929, *Proc. Zool. Soc.*, **1929**: 284–5).

Attacks by birds on migrating butterflies observed at Panama by Miss Cynthia Longfield.

Prof. Poulton said that it was interesting to compare Miss Longfield's experience in Panama with that recorded above in Costa Rica. The following extracts had been kindly extracted from her diary written at the time:—

"*June 9th*, 1924. We reached Colon at 1.30, steaming straight to the coaling wharf, which is on an island in Christobal district. On the way there, past the dock piers, we saw literally hundreds of butterflies, mostly Catopsilias, flying across the harbour towards the south-west. It was an extraordinary sight.

" *June* 10*th*. We got to Coco Solo in 15 minutes and found it was a Naval Base near a mangrove swamp. . . . We started to walk back along the line, and struck a motor road beside the swamp. From the woods behind, quantities of lovely butterflies were continually coming, but so fast we couldn't get them. . . . The swamp was full of clumps of a huge kind of fern, not much mangrove, a quantity of a white flowering bush, and some small shrubs with lovely white allamanda-like flowers, but no smell. The flowering bush was scented and attracted the butterflies, also some large cuckoo-like brown birds, who were lying in wait to make sallies on them."

Miss Longfield remembered that the birds attacked many times, but she had kept no record of the species they pursued. " They were sometimes successful, but quite often missed. Possibly our presence made the butterflies more wary."

Four especially striking examples of birds' beak-marks on the wings of butterflies.

Prof. Poulton showed two broad beak-marks, one on the right hind-wing of a male *P. bellargus*, Rott., taken at Folkestone, 4 June, 1914, by W. Rait-Smith; the other on the left fore-wing of *Pieris brassicoides*, Luc., taken 26 January, 1925, at Tamanjayage, Shoa Gimira Prov., S.W. Abyssinia, by H. E. Arnold Hodson, C.M.G. Also narrow beak-marks extending from the costa across all four wings of the Hesperid *Parnara zelleri cinhara*, Wall., from Hoihow, Hainan (Jan. 1920 : C. T. Bowring). Some of these marks were evidently made when one wing overlay the other. Finally a long narrow mark of great interest because of its position near and parallel with the shorn edge of the left hind-wing of *Acraea pharsalus*, Ward (Usambara Mtns., Amani to Makweli : 7 Sept. 1918 : W. A. Lamborn, O.B.E.). The edge of a butterfly's wing shorn as with scissors—an injury by no means infrequent—always suggested the effect of a bird's beak and of no other natural agency. The association of an undoubted beak-mark provided interesting confirmation of this conclusion.

Further observations on the parasematic " false head " of Lycaenid butterflies in relation to the attacks of enemies.

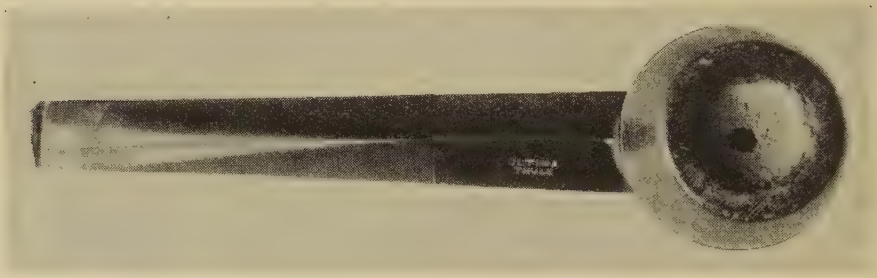
Prof. Poulton said that he had drawn the attention of Fellows to all the independent observations on these remarkable adaptations which had come to his notice. References would be found in 1922, *Proc. Ent. Soc. Lond.*, **1922** : xlix, c, and in the quoted earlier publications. A later instance was recorded in 1930, *ibid.*, **5** : 7, while the term " paraseme " was introduced in *ibid.*, p. 16. He had, however, missed an interesting paper by C. L. Collenette, F.E.S., in 1922, *J. Straits Branch, Roy. Asiat. Soc.*, No. **85** : 230–231. The author here came to the conclusion that the adaptation, at any rate in Malayan Lycaenidae, was mainly directed to protect against lizards, the conclusion reached by Dr. V. G. L. van Someren from his observations on E. African Lycaenidae (1922, *J.E. Afr. & Uganda Nat. Hist. Soc.*, **17** : 18 and plate; abstract in 1922, *Proc. Ent. Soc. Lond.*, **1922** : xlix, c). It could hardly be doubted, however, that, in northern latitudes, the protection was against birds, especially considering the well-developed paraseme of Hairstreaks which settle beyond the reach of our northern lizards (*ibid.*, **5** : 7).

Observations by E. A. Andrews on the mud nest of a wasp, *Rhynchium flavomarginatum*, Sauss., built in the bowl of a pipe.

Prof. Poulton communicated the following interesting notes and photographs by Mr. E. A. Andrews, and exhibited the male wasp which emerged from the mud cell and had kindly been determined as *Rhynchium flavomarginatum* by Mr. R. B. Benson.

"*Indian Tea Association: Tocklai Exp. Stat.: Cinnamara P.O.: Assam.*

"15 *September*, 1931.—Last week I posted to you a pinned specimen of a Mason Wasp, which is of interest owing to the situation of the nest, as you will see by the accompanying photographs. The pipe was put in the rack for a rest, as being too foul to smoke any longer, even when cleaned, and the nest was found to have been made in the bowl two days later. The nest was first observed early on the morning of August 13th, the egg having presumably been laid on August 12th. The adult emerged on August 27th, so that the period of development was 14 days.



Mud nest of wasp in bowl of pipe.

"The earthwork in the nest consisted of two layers or partitions, the one you see in the photograph, and another lower down the bowl, the space between the two —the cell—being about half an inch in depth. Before commencing to build, however, the mother wasp had plugged with earth the hole at the bottom of the bowl of the pipe and leading to the stem, and the bottom layer or floor of the cell was half an inch from the bottom of the bowl. Each layer of earth was one-eighth of an inch thick. During development the pipe lay in a breeding-jar with the bowl horizontal. On opening up the nest I found that a hole similar to that seen in the photograph, and the same size, had been made in the bottom layer of the cell, which would seem to indicate that the insect had tried to get out that way first, and that, at any rate when the nest is moved, as this was in taking it to the insectary, the occupant has no sense of the orientation of the cell.

"Inside the cell were found one larval skin and the pupal skin, but no other remains whatever, all the food and previous cast skins, if any, having been entirely consumed.

"I nearly forgot to mention that on the surface of the lower partition of earth was a thin, but very tough, parchment-like layer, but I could find no trace of such a covering at the sides or beneath the upper partition of earth. The inside diameter of the bowl of the pipe is thirteen-sixteenths of an inch. The carbon deposit inside the bowl was three-sixteenths of an inch thick, and the diameter of the cell was therefore five-eighths of an inch.

" The points that strike me as of interest are :—

" (1) The choice of the pipe-bowl for the nest. The bowl itself would not be objectionable, but the stem must have been most offensive.

" (2) The plugging of the stem before building the cell. Was this because of the offensiveness of the stem (intelligence ?) or to prevent ingress of possible enemies (instinct ?) ?

" (3) The lack of a sense of the orientation of the cell shown by the occupant.

" (4) The extreme cleanliness of the cell when opened. There was not even a tarsal claw left to indicate what the food-supply had been, and there was obviously not a particle of food in excess of what was necessary."

The rare Syrphid fly *Pocota apiformis*, Schr., in Huntingdonshire.

Prof. POULTON said that Mr. J. W. Saunt had informed him that he had taken a fine female of this species at Warboys, on 16 May, 1927. (For other recent records see 1930, *Proc. Ent. Soc. Lond.*, **5** : 98.)

Further observations on the Common Earwig (*Forficula auricularia*, L.) as the prey of the Long-eared Bat (*Plecotus auritus*, L.). Convincing evidence of the nocturnal flight of *F. auricularia*.

Prof. POULTON said that the forceps of *F. auricularia*, first noticed in 1930 among the débris dropped by a Long-eared Bat at Oxford (1930, *Proc. Ent. Soc. Lond.*, **5** : 41), had again appeared in the same position during last May. These forceps, the great majority being of males, were collected on May 8, 9, 10 and 12. Wings of 1 *Taeniocampa gothica*, L., were found on May 10, and of 1 *Taeniocampa instabilis*, (Fab.) Guénée, on May 9.

He had recently (1931, *ibid.*, **6** : 10) drawn attention to the conclusions of Mr. H. R. A. Mallock, F.R.S., that the Common Earwig was incapable of flight (1919, *Proc. Zool. Soc.*, **1919** : 116), and he was therefore glad to record the following evidence which, in his opinion was conclusive.

(1) From Miss Cynthia Longfield :—" 4 *May*, 1931.—I have just been reading your account of the Long-eared Bat devouring the Common Earwig, in 1930, *Proc. Ent. Soc. Lond.*, **5** : 41–43. I see that you state few people have recorded this earwig as flying. Most certainly I have seen it alight and fold its wings in the daytime, about twice, I should think, but I cannot remember where. It was the large species, which I take it was the Common Earwig, *F. auricularia*. But I should say nocturnal flights were the most usual, and for this I have the following proof. Girl Guide camps in July or August in hot weather are very frequently invaded by hosts of earwigs. Every tent is full, in fact it is a very usual, harmless but annoying plague we have to deal with, while camping out. I am quite sure any army or territorial officer will confirm what I say, as I know it is a pest campers always may have to deal with. As the tents are pitched in open fields, and hardly likely to be the resort of hundreds of earwigs, they must arrive on the wing, and after dark, or we should see them. I have always thought we were unlucky to be in the path of a flighting of earwigs on a hot summer night, attracted perhaps

by the fire or lantern light on the white tents. It never occurred to me that it was not well known. The lights in our camps are never strong, so they would not be directly attracted by light, but perhaps the white tents might bring them, although they become just as numerous in green tents. Perhaps a slight shower as they are passing brings them down."

(2) From Miss L. E. Cheesman :—" 7 *May*, 1931.—Did I understand that you wanted evidence of earwigs (in England) flying at night? because I can give you it on that point, but *none on flying to light.* I do not know the species, but suppose that it was *F. arvense* which used to invade our house in the country and our tents. Any wet summer we expected plagues of them, and I am afraid I took it for granted that they came to the *dry* for the same reason that the inverted flowerpot of dahlia growers will trap them. I have not actually seen them flying because they never did so until the lights were out, but then one lay down with an ear open for the dreaded plop, plop! on the pillow, when the ceiling had been cleared of them so that they could not have dropped. On striking a match I have seen them on my pillow folding their wings.

" We were obliged to go systematically round our bedrooms with a glass of boiling water to clear them, and even then earwigs appeared out of holes in the wainscot. My biggest bag was 208! In the tents while camping we cleared them by day, but the next evening more would have appeared. I have seen them crawling up the guys and walking in the ventilators. They also flew about in the tent at night, but never in the light. If, however, one held a light close to them they remained motionless, as some spiders will do. They did not fly in during the night, for if one cleared the walls they remained cleared until the following evening.

" On Raiatea, Society Islands, I saw a lovely flight of dark blue earwigs in the daytime."

(3) From Mr. J. Hodgkinson, M.A., Fellow and Tutor, Jesus College, Oxford :—" I went under canvas with my company of townsmen in a field near Harpenden in the summer of 1915. It so happened that there was a meeting for all officers after Mess on the very first evening. We went back to camp about eleven, and were amazed to find every tent lit up. I went along the lines: 'Sergeant-Major, what's the meaning of this?' 'The camp's alive with earwigs, sir, and it isn't safe for the men to sleep.' One by one the N.C.O.'s appeared, the last a regular figure of fun with pants and towel bound round his head. All the soldier was stripped away (and he was a very fine one for whom I had the utmost respect). 'They'll creep into your ears, Mister, and drive you mad.'

" The camp *was* alive, although we had not been conscious of any before nightfall. However, the men settled off on the assurances of the officers, and happily none of us lost his reason noticeably."

Prof. Poulton said that he had had a similar experience of the Common Earwig (*F. auricularia*) invading tents (and attacking specimens on the setting-boards) when camping out in July 1875 or 1876. There could be no doubt that the numbers which suddenly appeared in the limited space could only be explained by flight from a far wider area probably stimulated by the scent of food. The observations recorded above appeared to settle, once and for all, the question of the Common Earwig's nocturnal flight.

***Papilio machaon*, ab. *niger*, Reutti.**

Prof. POULTON communicated the following on behalf of Dr. COCKAYNE and Mr. L. W. NEWMAN.

The original stock consisted of sixty wild larvae found near Ranworth. Pairings of the imagines, all of which were typical, produced several hundred, again all typical, in the next generation. Pairings of some of these gave 1800 pupae, and at least seven black imagines were bred. One of them, a black female, was paired with a typical male from the Ranworth stock, and laid ninety eggs, of which forty-five were infertile, and twenty-one pupae were obtained. Four imagines, two black females, one crippled, and two typical males emerged in the autumn of 1930, two pupae died during the winter, and fifteen emerged in the spring of 1931, four black, three males, and one female and eleven typical, five males and six females. One black male, though apparently healthy, died in a few hours. Thus the brood consisted of six black, three males and three females, and thirteen typical, seven males and six females. Two pairings between black males and typical females from the stock resulted in many eggs, all infertile. Typical members of the brood paired with typical ones from the stock also gave infertile eggs, and a typical male paired with a typical female both of the brood containing black ones gave a few eggs, which changed colour, but failed to hatch.

It is clear that the black form is not a dominant due to a single gene, but it may be a recessive, and though the ratio of black to types, 6 : 13, is not very close to the expected ratio of 1 : 1, the disproportion may be due to the greater delicacy of the black form. It is possible, however, that the black is due to two dominant genes, neither of which alone causes any outward change in the appearance. On this assumption, if one gene is represented by A, and the other by B, and their recessive allelomorphs by a and b, one or more of the original wild larvae must have been constituted Aabb, and one or more aaBb. In the next generation pairings of these with type, aabb, would give some with the same constitution, and in the succeeding generation the brood, or broods, which produced the seven black ones in 1929, may have had parents with the constitution Aabb and aaBb respectively, giving one black, AaBb, to three typical, Aabb, aaBb and aabb. The black, AaBb, was then crossed with an apparently typical one from the stock constituted Aabb (or aaBb) and this would give 2 AABb : 4 AaBb (all six black) and 4 Aabb : 2 AAbb : 2 aaBb : 2 aabb (all ten typical). This ratio of 6 : 10 is fairly close to the one actually obtained, 6 : 13. A pairing between two black parents would have decided the question, for if black is recessive all the progeny would have been black, but if it is a double dominant some would have been normal. The actual results are inconclusive, but it seems more probable that black is recessive. It is more likely that one of the original wild larvae was heterozygous for black, a recessive gene, than that one was heterozygous for one dominant gene and another heterozygous for a second dominant gene. On the other hand, if black is due to two dominant genes there was a greater likelihood that a male chosen at random from the common stock would have been heterozygous for one or other of two dominant genes than for the single recessive gene, as it must have been if black is recessive, and the ratio of black to type is closer to that expected on the second hypothesis.

A list of all the black *machaon*, nine in number, known to have been taken in England or on the Continent up to 1925, was published in 1925, *Int. Ent. Z.*, **19** : 86.

The Physiology of Excretion in a Blood-sucking Insect.

Dr. WIGGLESWORTH gave a brief account of the physiology of excretion in the blood-sucking Reduviid bug, *Rhodnius prolixus*, and demonstrated the various methods of experimentation employed. The chief conclusion arrived at was that the upper parts of the four Malpighian tubes secrete a solution of acid urates from the blood into the lumen, and that in the lower parts water and base are reabsorbed, leading to a precipitation of the insoluble uric acid. This mechanism enables the insect to accomplish its excretion of nitrogen with a minimum loss of water.

This work has already been published in full in three papers in 1931, *J. Exp. Biol.*, **8** : 411–451.

Papers.

The following papers were read :—

1. " An extrusible organ in *Mantispa styriaca*," by H. ELTRINGHAM, F.R.S.

2. " New exotic species of the genus *Ecnomus* (Trichoptera)," by M. E. MOSELY.

3. " African beetles of the family CARABIDAE," by A. W. JOBBINS POMEROY.

4. " New African ACRIDIDAE in the collection of the British Museum," by N. C. E. MILLER.

5. " The influence of temperature on the life-history of insects," by E. JANISCH, communicated by B. P. UVAROV.

6. " Entomological Expedition to Abyssinia, 1926–27 : Hymenoptera, I. Apoidea (exclusive of *Andrena* and *Halictus*)," by J. D. ALFKEN, translated and communicated by HUGH SCOTT.

ANNUAL MEETING.

Wednesday, January 20th, 1932.

Dr. H. Eltringham, F.R.S., President, in the Chair.

Dr. S. A. Neave, Secretary, read the names of Fellows nominated as Officers and Council for the ensuing year, and announced that they had been duly elected in accordance with the Bye-Laws.

He then read the following :—

Report of the Council.

Though there were no events of importance to the Society in 1931 comparable with those of the preceding year, the Council is able to report satisfactory progress as well as plans for the further extension of its activities, despite the adverse economic conditions prevailing. One of the more interesting of these is the decision to found the new monthly journal *Stylops*, the first part of which has just been published. Fellows are reminded that they have the privilege of subscribing to this journal at a special rate, and the Council hopes that they will assist this enterprise by so doing.

Preliminary consideration has also been given to the celebration of the Society's Centenary, which takes place in the summer of 1933. In this connection the Council has decided to publish a History of the Society, and in order that this may be as complete and accurate as possible, Fellows are invited to communicate to the Secretary any information, or to forward on loan any documents or photographs that they may have, relating to the Society or its predecessors. It has also been decided to establish a Centenary Fund to provide the publications with a permanent endowment.

Since the last Annual Meeting, 3 Honorary Fellows, Professor J. H. Comstock, Professor A. Forel, and Father E. Wasmann, and the following 8 (8) Fellows have died, or their deaths have been ascertained (the numbers in brackets in this and the following paragraphs indicating the corresponding numbers for last year) :—J. W. Bowhill, W. Cook, A. Faz, E. John, F. Muir, H. E. Norris, A. Philpott, and F. G. Rambousek.

The following 31 (9) Fellows have resigned :—R. R. Armstrong, E. E. Bentall, F. W. Bewsher, T. D. Broughton, A. S. Buckhurst, A. M. Champernowne, Sir P. H. Clutterbuck, H. W. Davey, J. E. Eastwood, W. H. Edwards, C. S. Elton, E. M. Eustace, H. Silvester Evans, F. H. Gravely, Mrs. O. Grey, Viscount Hood, Miss W. P. K. Hughes, F. P. Jepson, J. N. Keynes, C. H. Lankester, R. Latta, T. N. C. Nevill, C. Nicholson, C. G. Nurse, M. A. Pallis, Miss A. E. Prout, R. S. Smallman, E. R. Speyer, M. N. Watt, W. B. Whitney, and C. W. ff. Wyatt.

The following 8 (3) have been removed from the List of Fellows in accordance with the Bye-Laws, Chapter XVI, section 3 :—C. Amirthalingam, T. J. Anderson,

F. Arthur, A. M. el Mistihawy, K. P. U. Nair, R. G. Simpson, G. S. Skinner, and W. H. Tapp.

During the year 5 Honorary Fellows, Dr. Walther Horn, M. Réné Oberthür, Prof. H. Rebel, Prof. F. Silvestri, and Prof. W. M. Wheeler, 1 Special Life Fellow, Mr. H. Powell, and 28 (39) Ordinary Fellows have been elected. This does not quite compensate for the losses during the year, which, however, represent little more than a cancellation of the exceptional gains made in 1930. The Society now consists of 12 Honorary Fellows, 5 Special Life Fellows, and 687 Ordinary Fellows.

The meetings have again been well attended, the average number of Fellows and Visitors at each being 57.

Owing to the generous assistance given by the Empire Marketing Board in providing nearly the whole cost of publishing Mr. Uvarov's large paper on Insects and Climate, it became possible to issue three Parts of the *Transactions* for 1931 (Vol. 79), instead of the customary two. These were published on 24th April, 10th July, and 31st December respectively. They comprise 22 papers by 20 authors. Of these, 7 deal with Lepidoptera, 3 with Diptera, 2 with Coleoptera, 2 with Hemiptera, 2 with Trichoptera, 2 with Ephemeroptera, 1 with Hymenoptera, 1 with Insect Teratology, and 1 with Insects and Climate. The volume consists of 562 pages and is illustrated by 41 plates, of which 3 are in colour.

In addition to the grant from the Empire Marketing Board referred to above, material assistance from a number of sources has again been received towards the cost of the volume, and the following contributions have been received or promised in respect of it :—Prof. Poulton has authorised grants from the Evolution Fund presented in his name to Oxford University by Prof. James Mark Baldwin, covering the cost of the two colour plates illustrating his own paper, of Plates I, II, and III in the *Proceedings*, and part of the cost of one paper by Dr. Eltringham. Part of the cost of Dr. Dixey's paper was provided by Jesus College, Oxford, by a grant from Prof. Poulton's Fellowship; the Board of the Carnegie Fund in South Africa have defrayed the entire cost of illustrating the paper by Prof. Janse, Dr. E. A. Cockayne has provided the plates illustrating his paper, and Mr. D. S. Wilkinson has defrayed the cost of the block of his plate.

The volume of the *Proceedings* will consist of about 125 pages, illustrated by 3 plates and a few text-figures.

The detailed work of the Society's business has been carried on by the Finance Committee under the Chairmanship of Mr. H. Willoughby Ellis, the Publication Committee under that of Sir Guy Marshall, and the Library Committee under that of Mr. R. Adkin, and the thanks of the Council are again due to those Fellows who have served on these Committees.

The Library has maintained the improvements reported respecting it last year, and the refurnishing of it has now been completed. The handsome bookcase presented last year by Dr. R. Stewart MacDougall has been brought into use, and now holds, amongst others, all the works on Lepidoptera. Dr. MacDougall generously supplemented this gift by presenting a large mahogany table for the display of journals, for use at which six chairs were purchased from the Society's funds.

The grant of £500 made last year to the Society by the Carnegie United Kingdom Trustees, which has now been expended, has enabled the Society to add a number of rare and expensive books to its collection. They comprise 293 works in 725 volumes and parts, as well as 299 pamphlets, and a detailed list of those not previously acknowledged will appear in Part III of the *Proceedings*, to be published in March.

It is, perhaps, not without interest, to record that for the first time for many years the Society's Library has been used in the elucidation of outstanding bibliographical problems, and that several papers have been published dealing with some of the riches which it contains. Further progress has been made with re-organising and cataloguing the very large collection of Separata, but with the staff at present available, this is necessarily slow. The use of the Library by Fellows, though slightly less, is still very considerably above the average of previous years. The number of books issued on loan amounted to 612 (863) borrowed by 295 (346) Fellows, and in addition several books not in the Library were obtained for Fellows through the National Central Library, to which the Society is now affiliated.

The Hon. Secretary of the Committee for the Protection of British Insects reports that the colony of *Chrysophanus dispar batavus* at Wood Walton Fen has again suffered from the attacks of parasites, principally *Phryxe vulgaris*, though not to the same degree as two years ago. In spite of this, a fair number of wild larvae escaped attack, and from observations made, it would appear that the early larvae manage to pupate safely, whereas the later ones are more liable to be parasitised. A certain number of larvae were collected early in the season, and placed on growing docks which were suitably protected. These pupated safely, and the imagines helped to make up for part of those lost through parasites. Although the summer was an exceptionally bad one, on the few fine days there were, the butterflies could be seen everywhere and in quite satisfactory numbers, subsequent examination of the docks disclosing that eggs had been laid plentifully. There is every reason to think there is an ample stock of hibernating larvae in the Fen, but as a precautionary measure, Capt. Purefoy is hibernating a number in confinement. It is satisfactory to report that the Committee were able to send over 100 pupae to Holland, to be put out in the Nardermeer Nature Reserve. Clearing at Wood Walton Fen is progressing very satisfactorily.

The Wicken Fen colony has also been most successful. Larvae appeared in the spring on most of the docks which had been planted the previous year. A final consignment of docks was planted, and about 700 larvae were put out. It is believed that most of these produced imagines. Wicken Fen appears, so far, to be free from *Phryxe vulgaris*. Numerous larvae were observed feeding before hibernation, and there is no doubt that the Committee have a good stock there with the makings of a promising colony.

The reports on the colonies at Leckford and Reading are not very encouraging. It appears that they were not kept under very close observation, owing in part to the unfavourable weather.

The colony of *C. dispar rutilus* at Woodbastwick in Norfolk still exists, and eggs were found on the docks in August. The Committee much regret to have to report the death of W. Hunt, the keeper at Woodbastwick. He was a keen naturalist, and was greatly interested in the progress of this colony, and it was largely owing to his care in the first instance that the experiment was successful.

A good start has been made with the protection of *Lycaena arion* in Cornwall. A Fellow of the Society has leased a well-known locality and has closed it entirely to collecting for a number of years. Notice boards have been provided, and a watcher appointed to guard against trespassers. The bracken and gorse will be kept mown in parts, to prevent the overgrowing of the thyme. It is hoped that, with the protection thus afforded, this colony will increase. The Committee have contributed towards the expenses incurred and desire to express their thanks to the Fellow concerned for his help in this matter.

Other species in which the Committee are interested were partly affected by the adverse weather conditions in 1931. Though the work of the Committee is progressing favourably, it must necessarily be slow in view of the difficulties by which it is attended. On the one hand, species in danger of extinction must be given such protection as is possible, but on the other care must be taken to avoid giving encouragement to those who regard all collecting as an evil and would be glad to render the collector himself extinct. No doubt the best method of securing the objects which the Committee have in view is the establishment of reserved areas such as Wicken or Wood Walton, but it is important that Entomology should be well represented on the Committees charged with the management of such areas, and it is hoped that every entomologist will take an active interest in any Nature Reserve in his neighbourhood, so as to ensure that the interests of Entomology are not overlooked.

The Report was adopted on the motion of Mr. H. J. Turner, seconded by Mr. E. B. Ashby.

The Treasurer's Report.

Capt. A. F. Hemming, Treasurer, then read the following Report :—

At the opening of the year 1931, the Society had completed its new housing scheme, but, though the Housing Fund had been closed at the end of the previous year, there remained a substantial excess of Liabilities over Assets on the General Fund. The financial policy of the Society during the year just closed has been directed to the twofold object on the one hand of maintaining the standard of the services which it gives to Fellows through the publications and the library, and, on the other, by means of rigid economy in administration to convert as quickly as possible the existing excess of Liabilities over Assets on the General Fund into an excess of Assets over Liabilities.

Thus, in pursuance of this policy, the publications of the year 1931 were substantially larger than in previous years, the *Transactions* consisting of three instead of the usual two parts, the third part being mainly due to the generosity of the Empire Marketing Board in making a large grant towards the cost of Mr. B. P. Uvarov's paper on Insects and Climate. The Library has been equally fortunate. In the first place, there has been available the balance, amounting to £153 19*s*. 8*d*., remaining unspent from the grant of £500 made to the Society by the Carnegie (United Kingdom) Trustees, by means of which very important accessions of rare books have been made during the year. In addition, it was found possible further to increase the annual contribution from the General Fund to the Library

Fund, which received from this source more than in any previous year. By this means, current literature has been obtained and further substantial progress has been made in overtaking arrears of binding. The Library has also greatly benefited by the generous gifts of equipment received from Prof. R. STEWART MACDOUGALL. House and Office expenses have been subject to close scrutiny and, in the aggregate, are substantially lower than in 1930.

The Society's income has remained more or less the same as in 1930. Income from subscriptions is slightly down owing to the reduction in the number of Fellows. That from the sales of publications shows, however, a satisfactory further advance.

On the whole, therefore, it may be claimed that the Society has maintained, or even increased, the scope of its activities during the past year. At the same time, it is satisfactory to be able to report that the greater part of the excess of Liabilities over Assets on the General Fund, resulting, as I have explained, from the Housing Scheme, has been reduced from £524 15*s.* 2*d.* by £352 12*s.* 0*d.*, *i.e.* the excess of Income over Expenditure in 1931 to the sum of £172 3*s.* 2*d.*, which it may fairly be anticipated will be liquidated in the year 1932.

The Report and Accounts were adopted on the motion of Mr. H. WILLOUGHBY ELLIS, seconded by Mr. R. W. LLOYD.

The PRESIDENT then read his address, and at its conclusion a vote of thanks to him, coupled with the request that it might be printed in the *Proceedings*, was moved by Prof. E. B. POULTON, seconded by Mr. G. TALBOT, and carried unanimously.

A vote of thanks to the Officers for their services during the year was then passed on the motion of Dr. G. D. HALE CARPENTER, seconded by Mr. N. D. RILEY, and Dr. S. A. NEAVE and Capt. A. F. HEMMING briefly replied.

THE ENTOMOLOGICAL SOCIETY OF LONDON.

TREASURER'S STATEMENT OF INCOME AND EXPENDITURE for the Year ended December 31st, 1931.

(Presented at the Annual Meeting, January 20th, 1932.)

GENERAL FUND.

INCOME.

1930. £	£		£	s.	d.	£	s.	d.
		To Subscriptions—						
	50	Received in advance for 1931 ...	40	6	8			
	1,231	Received in 1931 for 1931... ...	1,231	13	0			
	74	Received in 1931 for previous years	46	19	4			
	1,355		1,318	19	0			
	118	*Less* Subscriptions in arrear at 31st December, 1930	115	0	0			
	1,237		1,203	19	0			
	115	*Add* Subscriptions in arrear at 31st December, 1931—Valued at ...	135	0	0			
1,352						1,338	19	0
123		,, Admission Fees				94	10	0
		,, Publications—						
	567	Sales	691	3	5			
	97	Donations towards cost	397	9	11			
664						1,088	13	4
6		,, Interest on Deposit at Bank				—		
63		,, Dividends on Investments (gross) ...				55	2	8
250		,, Rents from Sub-Tenants				250	0	0
220		,, Contributions by Sub-Tenants towards House Expenses				247	7	7
12		,, Hire of Meeting Room				3	3	0
—		,, Donation by Dr. R. Stewart MacDougall for Library Furniture				110	0	0
25		,, Reserve for amounts due to Society irrecoverable at 31st December, 1929, written back				—		
1		,, Miscellaneous				5	2	5
817		,, Excess of Expenditure over Income carried to Balance Sheet				—		
£3,533						£3,192	18	0

EXPENDITURE.

1930. £	£			£	s.	d.	£	s.	d.	£	s.	d.
			By House Expenses—									
	207		Wages				213	13	0			
	113		Fuel, Gas and Electric Light ...				111	0	5			
	26		Insurance and Water				45	10	8			
	314		Repairs Fund—Transfer				50	0	0			
	33		Miscellaneous				46	5	10			
693										466	9	11
			,, Office—									
	524		Salaries				549	17	10			
	52		Printing and Stationery				39	18	6			
	33		Postage				30	5	11			
	10		Audit Fee				21	0	0			
		7	Superannuation ...	19	2	4						
		5	*Less* Employees Contribution	9	18	0						
	2						9	4	4			
	19		Furniture and Equipment ...				20	13	0			
	22		Miscellaneous				20	5	6			
662										691	5	1
			,, Library—									
	156		Library Fund Transfer				179	4	6			
	42		Repairs to Premises				—					
	10		Fee for Valuation of Library ...				—					
	32		Furniture				120	13	6			
240										299	18	0
758			,, Cost of Publications							1,357	13	0
25			,, Donation to Zoological Record ...							25	0	0
1,155			,, Transfer to Housing Fund							—		
—			,, Excess of Income over Expenditure carried to Balance Sheet							352	12	0
£3,533										£3,192	18	0

STATEMENT OF INCOME AND EXPENDITURE for the Year ended December 31st, 1931.

WESTWOOD BEQUEST FUND.

1930. £	INCOME.	£ s. d.	1930. £	EXPENDITURE.	£ s. d.
7	To Interest on Birmingham Stock	7 3 8	7	By Income for the Year, carried to Balance Sheet	7 3 8

HAMILTON DRUCE BEQUEST FUND.

1930. £		£ s. d.	1930. £		£ s. d.
44	To Interest on New Zealand Stock	43 16 6	44	By Transfer to Library Fund	43 16 6

CARNEGIE BOOK PURCHASE FUND.

1930. £		£ s. d.	1930. £		£ s. d.
—	To Balance brought forward from 1930	153 19 8	346	By Expenditure on Books	153 19 8
500	,, Grant from Carnegie United Kingdom Trust	—	154	,, Balance carried to Balance Sheet	—
£500		£153 19 8	£500		£153 19 8

LIBRARY FUND.

1930. £		£ s. d.	£ s. d.	1930. £		£ s. d.	£ s. d.
44	To Transfer from Hamilton Druce Bequest Fund —Interest on New Zealand Stock	43 16 6		112	By Expenditure on Books	116 4 7	
156	,, Transfer from General Fund	179 4 6		90	,, Binding, Repairs and Insurance	82 9 8	198 14 3
—	,, Miscellaneous	8 1 9	231 2 9	—	,, Excess of Income over Expenditure carried to Balance Sheet		32 8 6
2	,, Excess of Expenditure over Income, carried to Balance Sheet		—				
£202			£231 2 9	£202			£231 2 9

REPAIRS TO PREMISES FUND.

1930. £		£ s. d.	1930. £		£ s. d.
313	To Transfer from General Fund	50 0 0	117	By Expenditure on Repairs	38 9 6
			174	,, Expenditure transferred from Housing Fund	—
			22	,, Excess of Income over Expenditure, carried to Balance Sheet	11 10 6
£313		£50 0 0	£313		£50 0 0

BALANCE SHEET, December 31st, 1931.

GENERAL FUND.

LIABILITIES.

	£	s.	d.
To Donations for Specific Purposes unspent	2	11	10
,, Sundry Creditors	766	15	10
,, Subscriptions received in advance	47	0	10
	£816	8	6

ASSETS.

	£	s.	d.	£	s.	d.
By Sundry Debtors—						
Subscriptions valued at	135	0	0			
Admission Fees	34	13	0			
Publication Sales	179	7	11			
Contributions to Cost of Publications	21	0	0			
Rent and Contributions to House Expenses ...	127	6	10			
Sundries	2	2	0			
				499	9	9
,, Payments in advance				37	9	0
,, Cash —						
At Bank...	103	13	2			
In Hand...	3	13	5			
				107	6	7
,, Excess of Liabilities over Assets—						
As at 31st December, 1930	524	15	2			
Less Excess of Income over Expenditure for year to date	352	12	0			
				172	3	2
				£816	8	6

WESTWOOD BEQUEST FUND.

	£	s.	d.	£	s.	d.
To Excess of Assets over Liabilities at 31st December, 1930	257	18	0			
Add Income from Investment for year to date ...	7	3	8			
	265	1	8			
Less Part Cost of Plate	15	1	8			
				250	0	0
				£250	0	0

	£	s.	d.
By £239 12*s.* 4*d.* Birmingham Corporation 3% Stock 1947 at cost ... ... (Value at date £142 11*s.* 3*d.*)	250	0	0
	£250	0	0

HAMILTON DRUCE BEQUEST FUND.

	£	s.	d.
To Excess of Assets over Liabilities at 31st December, 1930	1000	0	0
	£1,000	0	0

	£	s.	d.
By £1,095 15*s.* 6*d.* New Zealand 4% Stock 1943/1963 at cost ... ... (Value at date £772 10*s.* 5*d.*)	1,000	0	0
	£1,000	0	0

CARNEGIE BOOK PURCHASE FUND.

	£	s.	d.
To Balance Overdrawn at Bank	1	17	4
,, Sundry Creditors	78	2	8
	£80	0	0

	£	s.	d.
By Balance of Grant due	80	0	0
	£80	0	0

BALANCE SHEET, December 31st, 1931.

LIBRARY FUND.

LIABILITIES.	£ s. d.	£ s. d.	ASSETS.	£ s. d.
To Sundry Creditors		20 4 4	By Library Furniture and Fittings (Not valued)	—
,, Excess of Assets over Liabilites at 31st December, 1930	20 15 6		,, Library Books (Valued at £10,000)	—
Add Excess of Income over Expenditure for year to date	32 8 6	53 4 0	,, Cash at Bank	73 8 4
		£73 8 4		£73 8 4

REPAIRS TO PREMISES FUND.

	£ s. d.		£ s. d.
To Sundry Creditors	1 10 0	By Cash at Bank	13 0 6
,, Excess of Assets over Liabilities— Excess of Income over Expenditure for the Year	11 10 6		
	£13 0 6		£13 0 6

HOUSING FUND.

	£ s. d.	£ s. d.		£ s. d.	£ s. d.
To Excess of Assets over Liabilities as at 31st December, 1930		£13,417 3 4	By Freehold Premises, 41, Queen's Gate, at cost	6,250 0 0	
			,, Cost of New Meeting Room Scheme, ...	7,167 3 4	13,417 3 4
		£13.417 3 4			£13,417 3 4

COMPOUNDING FUND.

	£ s. d.	£ s d		£ s. d.	£ s. d.
To Excess of Assets over Liabilities at 31st December, 1930 (Representing Estimated Liability of Fund at that date—subject to revision quinquennially.)		1,185 0 0	By £1,354 2*s*. 2*d*. 2½% Consols valued at 6th March, 1929	737 19 9	
			,, £532 3*s*. 5*d*. 4% Consols valued at 6th March, 1929 ... (Value at date 1,186 11*s*. 7*d*.)	447 0 3	1,185 0 0
		£1.185 0 0			£1,185 0 0

(Signed) A. F. HEMMING, *Treasurer.*

We have examined the above Balance Sheets and Accounts with the Books and Vouchers of the Society and certify them to be correct. The Solicitors have certified to us that they hold the deeds of 41, Queen's Gate for safe custody on behalf of the Society, and we have verified the other Investments and Bank Balances.

(Signed) W. B. KEEN & Co., *Chartered Accountants.*

23, *Queen Victoria Street,*
London, E.C. 4.
15*th January*, 1932.

THE PRESIDENT'S ADDRESS.

LADIES AND GENTLEMEN,

You have heard the Council's and Treasurer's Reports, and as my address has had to be prepared before these were drafted, it is scarcely possible for me to do more at the moment than to say how much we appreciate the painstaking work of our officers. Those of you who are, or have been, on the Council know how great a responsibility falls on the Secretary and Treasurer, in connection with the administrative work of the Society, and no one is in a better position to esteem their good offices than your President, whose work is not merely facilitated but rendered the more pleasurable by their ready help and valuable advice. I would also add a word in appreciation of the work of our Registrar, whose courteous and ready assistance is always at our disposal.

Amidst so much that is congenial, I have, in common with my predecessors, one unhappy duty to perform, and that is to record the losses the Society has sustained during the past year of my office.

No less than fourteen Fellows have passed away since our last Annual Meeting.

J. W. BOWHILL, a well-known Scottish Entomologist, elected in 1927, was one of the many who have found time during the relaxations of a busy life to devote attention to the charms of Natural History. A good shot and an expert fisherman, all the creatures of the wild were to him the pages of an interesting book. He amassed collections of several Orders, though in his later years he was especially interested in Coleoptera. His wide interests and attractive personality made him a charming field companion, and it is to be regretted that he published little or nothing of his store of knowledge, especially observant as he was of the life-histories of his subjects.

Professor J. H. COMSTOCK, elected an Honorary Fellow of the Society in 1911, died in March at the age of 82. Bereft of his father when a mere child, and in spite of the handicap of extremely poor circumstances, he continued to foster his own naturally studious tendencies, and though at first mainly interested in Botany he was led, by the chance purchase of an early work on injurious insects, to turn his attention to Economic Entomology. By his own strenuous and persevering efforts he contrived to enter Cornell University, where as a climax to a rapid and brilliant course he ultimately became Professor of Entomology and General Invertebrate Zoology, which position he held till his retirement in 1914. From 1879 to 1881 he was United States Entomologist at Washington. He made elaborate studies of Scale Insects, Cotton insects, and Wireworms. His work with Needham on Insect Wings is well known. Like so many who have had to master difficulties single-handed, he was a great teacher and a concise writer.

W. Cook, of the Gold Coast Department of Agriculture, had only been a Fellow for two years, and had not, at the time of his death, completed the first year of his service. We deplore the loss of a young Entomologist of promise.

A. Faz, of Santiago, Chile, was also one of our younger Fellows, at least by date of election.

Professor Auguste Forel was elected an Honorary Fellow in 1894. He was born in 1848 of Swiss and French parents. Almost his earliest recollections were of ants which lived under a step in his father's garden, and a volume of Huber, dedicated to his grandmother by the author, gave him his first insight into a knowledge of the insects to which he gave the study of a lifetime. He took a medical degree at Zurich, where he became Professor of Psychiatry, from which post he retired in 1898 to pursue his Entomological studies. When only eleven, he made up his mind to be an " Ant Historian," and as he says in the preface to his great work *The Social World of the Ants*, he kept his word. I need hardly dwell further on the extent of his work and researches in Myrmecology. They are well known to all Entomologists.

Professor P. Groom, F.R.S., was a botanist of great distinction. After taking first-class honours at Cambridge he studied for a time at Bonn, and was afterwards appointed to a professorship at Whampoa. Retiring to England in 1892, he was for some years in Oxford, and after a short stay in Edinburgh became head of the Biological Department at Cooper's Hill. Subsequently he was head of the Botany Department at the Northern Polytechnic, and at the time of his death was Professor at the Imperial College of Science and Technology.

Evan John was the senior Fellow of our Society, having been elected in 1865. He died at the ripe age of 92. The Squire of Llantrisant, as he was affectionately known, was the only surviving member of the original Cardiff Naturalists' Society, and possessed a very fine collection of Lepidoptera. His knowledge of the Microlepidoptera was exhaustive, but he unfortunately published little beyond a few scattered notes many years ago.

F. M. Mackwood died at Colombo on June 19th. Born in 1843, he was a Fellow from 1900 to 1925. He had a wide knowledge of the Lepidoptera of Ceylon and Burmah, and Moore, Marshall and de Nicéville, Hampson, Bingham, and Ormiston all pay tribute to the value of his advice and assistance. He published very little, but his name is commemorated in the nomenclature of at least eight species of Oriental Lepidoptera.

Dr. Frederick Muir was born in 1872 and was elected a Fellow in 1901. At an early age he entered the offices of the Eastern Telegraph Company at Alexandria. Transferred to Aden he became associated by correspondence with the late David Sharp. As a result of his interest in Entomology and through Sharp's recommendation, he was ultimately appointed to the staff of the Hawaiian Sugar Planters Association's Experiment Station. One of his first successes was the discovery and introduction of the Tachinid Fly, *Ceromasia sphenophori*, as a control of the Cane-boring Beetle, *Rhabdocnemis obscurus*, a research which occupied several years' work under unpleasant and frequently unhygienic conditions. On the death of Kirkaldy he took up research on Hemiptera and did excellent work on their morphology. Whilst on leave in England he collaborated with Sharp on the male genital tube in Coleoptera, and the dissections and drawings made by him are a lasting monument to his manipulative and artistic skill. He successfully introduced into Hawaii parasites of the Japanese beetle and Sugar Cane Leaf-hopper. After his marriage to Miss Sharp he settled in Honolulu, but was compelled by ill health to relinquish his post. He was a vice-President of our Society in 1930. Unfortunately he never really recovered his health, and after several relapses he passed away on May 13th. He will always be remembered for his great work on the FULGORIDAE, on which he published over 100 papers. A great naturalist and a good companion, he will be missed alike for his ability and his good-fellowship.

H. E. NORRIS had only been a Fellow since 1929. I have been unable to obtain any particulars of his work.

ALFRED PHILPOTT, who died at the age of 60, during his earlier life was engaged in commercial pursuits, but through the recommendation of Dr. R. J. Tillyard was ultimately appointed Assistant Entomologist at the Cawthron Institute at Nelson. He distinguished himself in saving the parasites of the Woolly Aphis when the stock had been nearly lost, and the millions now controlling that pest are all the offspring of three pairs which he carried through the critical time. Really more interested in pure than in applied Science, and being in fortunate circumstances, he resigned his post as assistant and became Honorary Lepidopterist, and was the author of many papers on New Zealand Lepidoptera. After leaving Nelson he became Honorary Entomologist to the Auckland Museum, which post he held at the time of his death. He published some 73 scientific papers. He was also a writer and essayist of considerable note. He will be missed, not only for his work, but also for his good nature and generosity of thought and action.

Dr. F. G. RAMBOUSEK of Prague had lately specialised on Insect pests of Sugar Beet.

Dr. A. E. SHAW, a Fellow from 1915 to 1925, was a medical man and distinguished as an Orthopterist. He died at Sydney at the age of 70. He published a Synopsis of the British Orthoptera in the *Entomologist's Monthly Magazine* for 1888–9.

ERICH WASMANN, S.J., Honorary Fellow of our Society, died at the age of 72, and will be remembered for his studies of the guests of Ants and Termites on which he published some 300 papers. If his conclusions were naturally hampered by his religious antipathy to evolutionary theory, they were, as Mr. Donisthorpe has said, always worthy of study and attention. He was held in high esteem as an Entomologist, and some twelve Entomological and other Scientific Societies claimed him as an Honorary Fellow.

I will ask those present to rise for a moment in respect for the memory of our Colleagues.

At this, the annual meeting of our Society, it is the custom for that Fellow who has the honour to occupy the Chair, to discourse for a while on some aspect of Entomology. Dealing with the largest class of the Animal Kingdom, Entomology is so wide a subject that no one student can reasonably be expected to possess an exhaustive knowledge of all its intricacies.

Recognising advanced study in a limited field as of greater value than a superficial knowledge of a more general kind, we tend to become specialists, and there is a natural temptation, when preparing an address, to choose that aspect of our Science with which one is most familiar. But the specialist has been facetiously defined as one who knows more and more about less and less. Such a form of address may be of value as a lecture, but can necessarily appeal mainly to the few rather than to a general gathering of Entomologists, who, as a body, represent many separate lines of research. Still less can it appeal to those who are outside our Society, and in whom one would desire to arouse an interest in a subject perhaps less understood by the world at large than any other Science.

I shall endeavour therefore to deal with Entomology, firstly as a subject of the greatest interest merely for itself, and secondly as something having a bearing on human progress, but little realised by the many to whom insects appear to be amongst the most trivial and unimportant of creatures.

It is my rather ambitious hope that what I have to say may be read by some who are not Fellows of our Society, or even by some who are not Entomologists.

In making such an effort, primarily before a meeting of specialists, I am well aware that not only do I run the risk of telling each of my immediate audience much that he already knows, but, what is worse, of presuming to speak of matters, concerning which some of my hearers could tell me a great deal more than I know myself. I am, however, supported by the knowledge that my friends here will, for the sake of mutual interest, gladly tolerate an occasional twice-told tale.

In a past so remote that time itself seems to fade into a mere figment of the imagination, and a thousand years count but as the faint beat of a tiny watch, when the moonrise threw deep shadows in thickets of waving fern, and glittered through the forest of crinoids to the ocean bed of a Silurian sea, a worm-like creature forsook the water, and began to move more successfully on six legs than it had formerly done on many. It contrived to extract from the air enough oxygen for its slow metabolism. The hands of the tiny watch moved on, and adventitious growths enabled the creature to float in the air or at least to leap further than before. The delicate membranes through which the air diffused into its body grew inwards and became branching tubes. The outgrowths attained the power of movement. There had arisen the primordial ancestor of a race of beings whose offspring were to survive through still uncomprehended ages, a race whose species should not only outnumber those of all the other creatures yet to be evolved, but should adapt their structures and economies to almost every conceivable environment then or afterwards to be found on the earth.

Through the long ages of the Devonian, and on into the Carboniferous, the race of insects thrived and spread till the great coal forests purred with the hum of wings. Great Dragonflies two feet in expanse hawked their prey and gigantic Mayflies danced in the steaming air. Is it entirely accident that the larvae of some Ephemerids still resemble the most primitive insects and are even reminiscent of Crustacea ?

If it seemed for a time that the insects were to evolve in the direction of increased size, as did the great reptiles millions of years later, no such line of development was in fact possible. Against such a climax evolution had already taken a fatal step. The insect breathed, not with lungs but by diffusion, a process which becomes very slow at a short distance from the outer air. Tissues a quarter of an inch from the surface will soon become deficient in oxygen, and although the exchange of gases in insect respiration is not quite so simple a process as was at one time supposed, the fact remains that few insects are much more than half an inch thick.

From what we know of their habits, their adaptability, weapons, and organisation, and their baleful influence on human activities, even though they are small, may we not say that the accident of the development of trachaeal respiration for ever precluded their total domination of the earth, to the ultimate exclusion of the human race itself ?

As Maeterlinck says :*—" The insect does not belong to our world. The other animals, even the plants . . . do not seem wholly strangers to us. In spite of all, we share with them a certain feeling of terrestrial fraternity. They surprise us, even make us marvel, but they fail to overthrow our basic concepts. The insect, on the other hand, brings with him something that does not seem to belong to the customs, the morale, the psychology of our globe. One would say that it comes from another planet, more monstrous, more dynamic, more insensate, more atrocious, more infernal than ours. It seizes upon life with an authority and a fecundity which nothing equals here below. We cannot grasp the idea that it is a thought of Nature of which we flatter ourselves that we are the favourite children. There is, without doubt, with this amazement and this incomprehension, an, I know not what, of instinctive and profound inquietude inspired by these creatures so incomparably better armed, better equipped, than ourselves, these compressions of energy and activity which are our most mysterious enemies, our rivals in these latter hours, and perhaps our successors."

The study of radio-activity has led to remarkable calculations of the time that must have elapsed during the great geological epochs. Previous estimates based on the rates of formation of strata and of their denudation had the disadvantage that we could not be sure that our clock had not gained or lost. Calculations based on the gradual disintegration of Uranium may be said to bear some analogy to observations made with a chronometer rather than with an ordinary clock, for even less than a chronometer is radio-activity affected by physical environment.

From such data it would seem that our great Dragonflies flourished at least 250,000,000 years before the human race began to walk erect. Other experimental forms of life reached their maxima of unwieldy absurdity and paid the penalty of extinction, but Nature's greatest triumph of complex ingenuity continues to prosper and to adapt its forms to every condition, even to the artificial environments created by the needs and humours of Man himself.

During his early experimental period, when eat-or-be-eaten was largely the controlling factor in his survival, Primitive Man doubtless found the maintenance of the subjective attitude a sufficient occupation. As to the small, and so far as he knew, insignificant creatures which must have been ready in their swarms to witness his development, those which doubtless inhabited his own person would be, as indeed in ignorant communities they still are, regarded as inevitable. For the rest, some might occasionally be eaten, and what remained were of no account.

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* *Annales politiques et littéraires, 1911.*

Any idea of the study of insects belongs but to yesterday. It is recorded that some two and a half centuries ago, an action at law was taken to set aside the will of a certain Lady Glanville, on the ground of insanity, the sole evidence in support of the claim being her alleged fondness for collecting insects. In matters of Entomological Science the legal mind has since progressed with what may be termed geological rapidity, since there are those present who will recall an occasion, when a learned Judge, now in poetic retirement, characterised the same occupation as infantile. In 250 years the indictment has undergone a slight amelioration hardly sufficient to be called a mutation. Posterity will doubtless be interested in tracing the inheritance or otherwise of a small variation.

Entomology, perhaps more than any other science, suffers from the materialistic outlook of the general public. Only about one person in a thousand seems to have overcome the obsession that every creature must be of some use, by which he apparently means some use to himself. Any suggestion that, from a human point of view, only an infinitesimal proportion of insects are of any use whatever, and that the majority are an unmitigated nuisance, seems to cause a shock to their purely homocentric conception of the beneficence of Creation. The same attitude of mind causes a mild surprise, if nothing less tolerant, that seemingly otherwise normal persons should occupy their time in investigating the habits and anatomy of minute creatures, without the intention, or even the idea of any practical application of the knowledge so acquired.

My friend and predecessor in this office spoke of our Society as a sanctuary for pure Entomology, and referred to the danger of Entomological research being hampered by demands for purely practical results. He also emphasised the point that our prosperity as a Society is due to the love of pure research. Relying, as we have done in the past, mainly on our own resources, we may indeed be limited in output, but at least we shall be more akin to the old-time craftsman, who knew not mass-production, and took a legitimate pride in the workmanship and artistry of his creations.

Practical results of the greatest importance, to some of which I shall refer later, do in fact arise from our researches, but for the moment let us consider briefly some of the more academically interesting features which a study of that other world of insects can reveal.

For comparatively early records one may refer to the Bible, though here and for many centuries then to come, practical aspects attracted the principal attention. The species mentioned are largely those which forced their attentions on the reluctant observer, and the fact that Baal-Zebub was the special God of Flies would not support a theory of the existence of an early school of Dipterology. An early predecessor of Mr. Donisthorpe had evidently observed ants, for their activities are twice referred to in Proverbs. Whether, as suggested by the late Canon Tristram, Job's reference to building a house as a moth, implies a knowledge of case-forming larvae may be doubtful, but it is interesting to note that the word in Isaiah translated scarlet or crimson is literally "crimson worm," and probably indicates the Syrian Cochineal. The Greeks were well aware of the metamorphoses of the Lepidoptera, and Aristotle was probably the first naturalist to employ travelling collectors, and that on a princely scale, since it is recorded that Alexander during his triumphant Asiatic campaigns employed a small army to collect for his tutor at an alleged cost of some £200,000.

At the International Congress of Entomology at Zurich, Dr. Horn called attention to the great rôle which insects had played in the fate of the people from 3000 to 600 B.C. He divides the epoch into three chapters :—Bee culture, the triumph of the Mulberry Caterpillar, and the Exodus. There is a tablet of ancient Egypt dated about 2600 B.C. describing in the clearest terms the practice of contemporary Apiculture. No doubt, in the absence of sugar, honey possessed an importance difficult to estimate at the present time. As to silk it would appear to have been cultivated in China in at least 3000 B.C. It was apparently not at first taken from cocoons, but from the glands of the larvae, and used for the strings of musical instruments, and for fishing-lines. How many of our trout fishermen know that an essential part of their finer tackle was in use nearly 5000 years ago?

The biblical catalogue of the insects which might lawfully be eaten would seem to support a claim for Moses as the first systematic Entomologist, though he appears to have confined his attentions to the saltatorial Orthoptera, as the one "beetle" mentioned is further described as "having legs above its feet to leap withal." Mosquito curtains were in use in Egypt as early as 470 B.C. Already in Greece in the time of Aristotle, attempts had been made to obtain silk from larvae other than the Mulberry Caterpillar, and we have even the name and address if not the telephone number of the modiste who was famous for costumes of this material, much favoured by dancers of the period, since they were so fine as to be scarcely visible.

Whilst one could wander thus in the more recent past we must descend more nearly to the present if we are to understand the growth of the study of insects.

Beyond affording data for theorising on the probable appearance of some of the earlier forms, the Apterygota present perhaps comparatively little general interest. Many of them are rarely seen and little known, though the familiar "silver fish" was recently the subject of a lawsuit, owing to its presence being regarded as an undisclosed drawback to the amenities of a furnished apartment. Its near relation, *Thermobia furnorum*, should be an interesting physiological study, since, delicate as it appears to be, it can exist, and indeed seems to prefer, surprisingly high temperatures. With the cockroaches, stick insects and grasshoppers we are on more familiar ground. Of the first, the commoner species are deservedly unpopular, and I am not sure that the rather inexplicable selection of this apparently irretrievable error of nature as an early lesson in insect anatomy has not much to answer for in the discouragement of budding zoologists. Nevertheless we must accord what respect we can to an animal whose ancestry can be traced in an unbroken line to Palaeozoic times. In *Grylloblatta*, the Cricket Cockroach, we find an example of the reverse of our heat-loving *Thermobia*. *Grylloblatta campodeiformis*, exhibited here some five years ago by Dr. Imms, thrives in Canada at an elevation of some 6500 ft., rejoices in a temperature of 0° C. and is best kept alive in vessels surrounded by ice. Though there are limits within which animals on this earth can exist, these and other insects I shall mention should be a warning to us not too hastily to assume that the conditions on other planets are necessarily inimical to every form of life. Apparently some Lepidopterous larvae and their parasites can survive several exposures to intense frost as low as — 47° C., whilst the upper fatal limit for many insects seems to be about 50° C.

In the stick insects we see our first examples of an almost incredibly perfect mimicry of natural surroundings. The faculty possessed by some species of continuing to produce, year after year, generations of self-fertile females provides a good example of the phenomenon of parthenogenesis familiar to Entomologists, and almost unknown to others. Amongst the grasshoppers and crickets we make our first acquaintance with sound-producing forms. The late Mr. Step included them amongst his insect musicians, and perhaps their noises may be regarded as music, in comparison with the organised cacophony to which some modern music has largely degenerated. Of the termites, or so called White Ants, we can take but passing notice, merely recalling their great communities, huge habitations, their granaries and their fungus gardens. Perhaps their most interesting feature is the presence in the digestive tract of Protozoa, by whose action the otherwise indigestible diet of wood is made available for assimilation. To be a queen of the termites can be no sinecure if her estimated production of a million eggs a year, during her six to nine years of life, is even approximately accurate.

In the Embiids, insects which have not even a popular name, we find one of the comparatively rare examples of the production of silk by a mature insect. There can be no more remarkable instance of the parallel development of the same organs in widely unrelated genera than the silk glands of these creatures. They are situated in the front feet, and in flies of the genus *Hilara* silk glands are also found in the same position and of a very similar structure. The formation of silk is itself a fruitful field for research. It would seem that insects can elaborate this material from various parts of the body, since a Carabid larva (*Lebia scapularis*) produces it as a secretion of the malpighian tubes, and these improbable organs serve the same purpose in Lace-wings and Ant-lions.

We cannot pass so lightly over the Anoplura, the biting and sucking lice, our first disease-carriers, prominent in the recollection of many of us here, and justly termed by my late friend and teacher Sir Arthur Shipley, " minor horrors of war." We recall that it was in the course of his heroic investigations into their activities as carriers of typhus that our late and universally beloved Fellow, Arthur Bacot, joined the great roll of honour of those who have given their lives in the cause of Science.

From such sad recollections it is well to turn to the dancing Mayflies. We have all admired their fluttering upward flight and graceful planing down accurately guided and controlled by the delicate tail filaments. It is not perhaps so generally known that the whole digestive tract, no longer required, as such, for its short life as a winged creature, is entirely remodelled to form an aerostatic apparatus. Nor does the interest end here, for surely never were such strange eggs as those of Mayflies, some of which are provided with fine silken threads which uncurl in water and attach themselves to any available support, while others have filaments

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which, uncoiling suddenly like springs, attach themselves by viscid button-like extremities.

In the Dragonflies, now small in comparison with their earlier ancestors, that surprising organ, the compound eye, has reached its maximum of complexity if not of efficiency, since it has been estimated that in certain species it may contain some 50,000 lenses. As in many insects these are not of uniform size. The upper part of the eye, presumably engaged in watching for hostile attack from above, has larger lenses, giving a picture less accurate but better adapted to detect rapid movement. An enemy as such is more important than its individual appearance. The smaller lenses below give the more accurate vision required for the selection of suitable prey.

The Hemiptera, or bugs, not only include a great diversity of forms, many of them by no means unattractive, but probably few Orders of insects present more serious problems for the human race. The damage they do to vegetation is increased by their appalling fertility. It must be admitted that a few species are beneficial, and of these the Lac insect is the basis of a great industry. Other forms produce cochineal, less valuable now in these days of aniline derivatives. Their small services, however, fade into insignificance beneath the swarms of aphides, scale insects, cotton-stainers, frog-hoppers, whiteflies, and other destroyers of human effort. Some are included with the insect musicians to which I have already referred, and the most famous of these is the Cicada. That the Greeks were observant field naturalists is evident from their knowledge that only the male can speak. We must refrain from reference to Xenarchus' oft-repeated, if ungallant reflection on the consequent felicity of the Cicada's domestic relations. Perhaps their most interesting feature is the extraordinary prolongation of the larval period, only exceeded by that of some beetles. With surprising punctuality after so long as seventeen years of subterranean retirement millions of individuals attain maturity at practically the same moment. The spectacle of the insects swarming on the trees has been described as resembling a sudden bursting into blossom. Again we have an interesting parallel development, for the Cicada's ovipositor is furnished with saws, with which it cuts holes in twigs, much as the unrelated saw-flies perform their boring operations.

The bugs include many other curious forms, such as the pond-skaters, one of which is marine, and has been found in tropical seas many hundreds of miles from land, and the aquatic giant *Belostoma,* large and voracious enough to attack a frog. In this species the male is rather humorously made to carry, till they hatch, the eggs, which are said to be forcibly attached to his elytra by the female. The Water Boatmen, the Membracids with their nightmare shapes, the beautiful flower-mimicking Jassids, the Fulgorids, unfortunately called Lantern-flies, and so long erroneously believed to be luminous, the Aphids with their complicated life-cycles, all furnish material for endless study; but we must pass on to the Neuroptera, of which the Nemopterids are surely one of Nature's jests, since the grotesque larva of *Pterocroce,* figured in our *Transactions* for 1923, with a neck longer than its body, and appropriately inhabiting the dust of Egyptian caves and tombs, gives rise to one of the most fairy-like of insect forms. In the Caddis-flies we find an Order, the interest in which has been greatly enhanced by one of our Fellows, Mr. Martin E. Mosely. Their beautiful larval cases, funnel-shaped nets, and other structures have long been known, but Mr. Mosely's discovery of the minute but complicated brush-organs in *Hydroptila*, consisting of elaborate sets of glands, scent-scales, and extensible brushes, protected by folding covers, and neatly arranged in the back of a head only about one-fiftieth of an inch across, has furnished one of our most remarkable chapters on Insect morphology.

Coming now to the Lepidoptera, it would be interesting to know how many of our Entomologists trace their first approach to a study of insects through the observation of butterflies and moths. In my own case one of my earliest recollections is that of a most attractive furry caterpillar, whose tenancy of a vacant chocolate-box renewed the interest so lately expired in that receptacle. Inspection, at first daily, became less frequent as more exciting things than an apparently inanimate ball of silk claimed my attention. But on one never-to-be-forgotten day a beautiful Tiger Moth appeared in all its freshness and glory, and my fate was sealed. The patterns of the butterflies and moths have furnished us with a long chapter on the mysteries of evolution and have disclosed a pageant of mimicry, the ever-increasing demonstrations of which will always be associated with the name of our honoured colleague, Professor Poulton, twice President of this Society. In the Lepidoptera we again find a multiplicity of devices for the production and distribution of aphrodisiac perfumes, long ago described by Müller, and since more fully investigated by other workers. We may be certain that fascinating discoveries still await the careful field observer, since the fact that some butterflies are animated powder-puffs had to be suggested in the histological laboratory before it was ever observed in Nature. If the compound eye has realised in the Dragonfly its maximum of development in mere multiplicity of lenses, it has reached its greatest efficiency in the butterfly's eye, for we have now the strongest evidence that, though the elements may be fewer in number, each provides a true erect image and has the nervous mechanism to perceive that image, and further, that many of these insects are not blind to the colours of the flowers and of each other. For the rest, Nature's masterpieces of pure beauty of form and colour are surely to be found amongst them, for what can exceed the metallic radiance of the Morphos, or the velvet and bronze of the Moth, *Chrysiridia ripheus*, the Lolonandriana or " King Butterfly " of Madagascar? Apart from their external characteristics, they furnish many opportunities for research, and we recall such examples as the complicated association of many species with ants. Through the patient labours of the late Dr. Chapman and Capt. Purefoy, we are now familiar with the strange life-history of our Large Blue Butterfly, and the manner in which its larva from being a blameless vegetarian becomes a carnivorous parasite in the nests of the long-suffering ants; but the story of the butterfly, *Liphyra brassolis*, is even more enthralling, since it emerges from its armour-plated pupa-case into a hostile world of ants, safe in the protection of an overcoat of detachable scales, the adhesive properties of which so confuse its enemies that it has time to make its way into the outer world.

We are still far from understanding the function of the beautifully constructed ears, or so they would seem to be, found in the thorax of Noctuid moths and in the abdomen in some other families. Do they hear sounds beyond our perception, and why in *Chrysiridia* is the auditory nerve in one sex reversed, as compared with its counterpart in the other?

In the Coleoptera we are confronted with the largest Order in the animal kingdom, too large indeed for any one person to study as a whole. The beneficent administrations of the Ladybirds and perhaps a few other species are completely outweighed by the depredations of the Cotton-boll Weevils, Wood-borers, Death-watches, Wireworms, and other pests. Many are of great interest in themselves, such as those Carabids which possess a more or less explosive type of poison-gas defence, the Malacoderm fireflies, glowworms, and railway beetles, and the Elaterid fireflies, all of which produce light of an efficiency that would revolutionise industry could we but even approximately imitate it. There are even aquatic species which produce light under water. Few indeed are the conditions to which some species is not adapted. They are at home on and beneath the ground, they fly in the air and swim in the water. Their larvae can extract nutriment from almost every conceivable kind of food, including tobacco, strychnine, and opium. Our *Proceedings* for 1928 record a beetle (*Niptus hololeucus*) which lived and thrived in casein in a stoppered bottle for twelve years, 1547 beetles being ultimately counted. The same species carried on existence in an unopened tin of Stramonium leaves for fifteen years, and has been known to thrive on cayenne pepper, sal-ammoniac, and in the cork of a cyanide bottle. As larvae they can exist for longer periods than any other insect, and in 1918 Dr. Gahan, then our President, showed us a Longicorn larva which had lived for thirty years in the wood of a pencil-box, and recalled an example mentioned by Packard, which had apparently lived for forty-five years. In this connection we are reminded of the suggestive and careful experiments of one of our Fellows, Dr. P. A. Buxton, into the question of the water-content of insects, and the probability thereby disclosed that some of them are able to decompose their fat substance into water and carbon dioxide, and so compensate for the lack of available free moisture. Not the least remarkable feature of beetles is their great range in size, varying as they do from some six inches in length to a mere fiftieth of an inch.

Passing over the Strepsiptera, the curious little parasitic insects, one of which is represented on the seal of our Society, we reach the Hymenoptera. Of these the Ichneumonoidea may be said to be beneficial to the extent that they prey on other insects, though like others of the Order they may, from a human point of view, carry this too far by destroying, hyperparasitically, other insects which are of service to us. Of the Chalcids, amongst the most interesting are the Fig Insects whose unconscious ministrations provide for the continuance of the Smyrna fig crop. In *Trichogramma* we find an insect so small that twenty may develop within a butterfly's egg. Some exhibit the phenomenon of polyembryony, a single egg developing into an embryonic mass which may produce several thousands of the parent form. The ants seem to us the most intelligent of all insects, but time will not permit us to dwell on their social systems, slave raids, horticulture, aphis herds, and other strange activities. Hardly less interesting than the ants themselves are the innumerable alien inhabitants of their nests and galleries. As Maeterlinck has observed, life in an ants' nest must be a demoniacal nightmare where weird and grotesque forms beg food in every passage and recess. The apparent intelligence of ants is largely counterbalanced by an indescribable stupidity in their relations with some of their parasitic guests, such as certain beetles, which are fed and tended by the ants, although they eat the ant larvae. Indeed, in many such examples the ants seem unable to distinguish between these parasites and their own species. The extent to which ants, had they been larger, might have dominated the earth, is suggested in the vivid description by Mr. Loveridge, in our *Proceedings* for 1922, of a raid on his house in Africa by Driver ants. The horrors of human cruelties could scarcely surpass the gruesome descriptions, given us by Major Hingston, of the Oecophyllas killing their victims by stretching. Even the inquisitorial wielders of the rack and thumbscrew did not inject irritant poisons into the dislocated joints of their unfortunate subjects, though they probably would have done so had they thought of it. There is even something rather ruthless in the way in which the same ant robs its own larva of its silk to sew together the leaves which form its nest.

We cannot linger over the bees and wasps. Many of their habits are familiar to us all. The Sawflies, so extensively studied by our late Fellow and President, Mr. Morice, surprise us, not only by their exquisite outfit of cutting tools, but also by their powerful and persistent biting powers. I have seen a roll of sheet lead which had been wrapped round a pine roller, forming at least thirteen layers. The wood contained sawfly pupae, and the emerging insects perforated all thirteen thicknesses of metal in order to escape. The example described some time ago in our *Proceedings*, in which a species had bitten its way through several cakes of chocolate, must have had a much easier and to our taste a pleasanter task. This power of biting seems to cease on emergence into the outer air, since a *Sirex* cannot, or at any rate does not, bite its way out of a match-box.

We must pass on to the Diptera. No other Order of insects has exercised so great an influence on the progress of the human race, and that by direct attack. Flies of many species are a continual menace, not merely by their irritating and blood-sucking habits, but also in their capacity as carriers of disease. We have seen that insects may live in or upon unlikely substances, but some of the EPHYDRIDAE seem to have chosen even more improbable surroundings. That some should inhabit brine pits, strong solutions of borax, alkaline lakes and hot springs is sufficiently remarkable, but that one species (*Psilopa petrolei*) should regularly live and thrive in crude petroleum is, as Dr. Thorpe has justly observed, one of the biological curiosities of the world. It can survive indefinitely in cedar oil and withstand the action of strong alcoholic picro-formol for twenty minutes. The bionomics of Diptera provide many items of interest, as for instance certain Chironomid larvae which can live at great depths, not only in lakes but in the sea. Paedogenesis, the production of offspring by larvae, is not unknown. Species of fungus-gnats are strongly luminous, whether of themselves or through some bacterial symbiosis seems not definitely established. I have already referred to the silk-spinning powers of certain flies, but a more militant encroachment on the perquisites of the spider is furnished by species of CYRTIDAE which are parasitic on spiders.

After the Diptera there remain only the fleas. How the rat flea, itself choked and starved by the plague bacillus, injects that deadly germ into the human blood, was graphically told to this Society by its discoverer, our late Fellow, Dr. Bacot. The practical importance of academic research on the classification even of fleas was brilliantly expounded by our ex-President at the last International Entomological Congress.

We have now hastily glanced at a few of the more remarkable characteristics of this strange world of insects. They exhibit the most intricate activities, are at home in all surroundings, can thrive on substances which, to us, are deadly poison, live in crude petrol, hot springs, and strychnine, survive for more than half the lifetime of a man on a diet of dry wood, produce complicated organic compounds, run, fly, swim, and lay a million eggs a year, exhibit elaborate physiological structure in the eighth part of a cubic millimetre, assume the outward appearance of other insects to which they are not related, or of members of other Orders, or even of inanimate and entirely alien objects. In no other class of the animal kingdom do we find anything to compare with their apparently unlimited power of adaptation. When, as so often happens, the activities of these creatures are inimical to human progress and health, the wonder is, not that we so frequently find ourselves defeated, but that we survive at all. The war between man and the insects may be said to be waged on two fronts, the Economic and the Pathological. Economic Entomology has at present attained a greater development in the United States than elsewhere, largely because that country has presented a wider virgin field for the activities of introduced pests. A rapidly developed agricultural industry in a comparatively young civilisation has provided problems of greater import than were likely to occur where the balance of Nature has had much longer periods in which to become adjusted. Apart from introduced pests, there is the more subtle danger of indigenous insects transferring their attentions from wild plants to imported cultivated species. Thus many of the worst cereal pests were already present, feeding on wild grasses, and the Colorado potato-beetle easily spread from the wild Solanum to the cultivated potato. Agricultural pests are attacked by two methods, the mechanical and the natural, the latter being technically termed Biological Control. The first explains itself, the second consists in making use of some natural enemy of the insects to be attacked, and breeding and distributing such enemies where their services are most required. As a recent example of the purely mechanical method we may recall the campaign against the Mediterranean Fruit Fly (*Ceratitis capitata*), which appeared in Florida in 1929. A sum of £10,000 was at once appropriated as an emergency fund, and in ten days some sixty scientific workers and inspectors were mobilised. All shipments from infested areas were stopped, and traffic subjected to inspection and confiscation. Ten instructional offices were established, and in rather over a month nearly a million sterling had been appropriated for expenses, while some 4500 persons were engaged in the work involved. Though the insect will attack almost any kind of fruit in Florida, Grape-fruit was principally affected. Within three months infestation was discovered in more than half the citrus-producing sections of the State. The country was divided into zones. In the first all fruit was destroyed. In the second all waste was destroyed and rigid inspection maintained. Zone 3 included all the rest of the country and any discovery of infestation automatically transferred that area to zones 1 or 2. The necessity for these widespread and costly measures is evident from the value of the crops involved, since some £60,000,000 is invested in their culture, whilst the value of investments in other fruit-producing States is said to be about £360,000,000. That the measures taken were effective is shown by the fact that while 500 new infestations were found in May, there were only eight in August, and by the middle of 1930 no adult flies could be found. Later reports suggest that the extermination has, at least for the time being, proved complete.

In our own country, whilst there are schools of Economic Entomology at several well-known centres, we may feel a pardonable pride in the Imperial Institute of Entomology, the rapid growth of which has taken place under the guidance of two of our Fellows, Sir Guy Marshall and Dr. Sheffield Neave; nor must we omit to mention the British Mosquito Control Institute, established and maintained almost entirely at his own expense by one of our Fellows, Mr. J. F. Marshall. Of the many successful enterprises carried out with the advice and assistance of the Imperial Institute of Entomology, one of the best examples is the control of the Coconut Moth in Fiji. To Dr. T. D. Tothill and his assistants, Messrs. T. H. C. Taylor and R. W. Paine, must be awarded the credit of having triumphantly solved a very difficult problem. The little moth *Levuana iridescens* was threatening the entire coconut industry in Ovalau and the neighbouring islands, and likely to spread to Vanua Levu Taveuni, and the Lau Archipelago. The defoliation of the trees and their ultimate restoration are beautifully illustrated in Dr. Tothill's book describing the campaign. Time will not permit me to refer in detail to each stage of the undertaking. It must suffice to record that a Tachinid fly, *Ptychomyia remota*, Aldr., was found to be controlling *Artona catoxantha*, an allied coconut pest in Java. Here once more is an example of the value and necessity of the work of the academic Entomologist in enabling a closely allied species to be found and recognised. After innumerable difficulties of collection, shipment and transport, all patiently and ingeniously surmounted, 315 of the adult flies were ultimately landed in Fiji at an apparent cost of over £11 per fly. After further difficulties and disappointments in breeding, success was at length attained and some 33,000 flies were liberated through the *Levuana*-infested districts. Six months after its introduction, the fly had spread through the entire area. The work was carried out in 1925. By June 1929 there had been no new outbreak of the moth for three years, and indeed the species has become distinctly rare. Not only has the whole industry of the region been saved, but coconuts can now be grown on the hitherto unproductive Viti Levu, an island of about the size of Jamacia.

It may well be asked, what will happen to the parasite if the host is practically exterminated? This is always an important question, since the beneficent parasite may itself be exterminated by a shortage of its normal prey. In the experiments with *Levuana*, when, owing to the attack of the fly, the moth became scarce in any district, healthy larvae of the moth were planted out and kept under observation. These were soon attacked by the *Ptychomyia*, showing that the fly could live in Fiji independently of the moth. On the small island of Naigani the moth had been so completely exterminated that it was thought probable that there had been no examples there for twelve months. Of thirty-two larvae or pupae introduced as a test, twenty-seven were at once parasitised, thus showing that the fly was contriving to exist on some secondary host. Of those available, two were known to feed on the rain tree and the cabbage respectively, but these plants were absent from Naigani, hence the experimenters had the satisfaction of knowing that the *Ptychomyia* had found some native secondary host, and could be relied on to continue its species ready to attack the coconut moth when the opportunity arose.

There are pests of cultivated land other than insects, and undesirable plants may, by their rapid growth and physical properties, cause widespread damage and inconvenience. Here the voracity and fertility of insects may sometimes be converted to human benefit, and the successful attack on the Prickly Pear in Australia is a further triumph for Applied Entomology.

Several species of the American cactus (*Opuntia*) were introduced very many years ago, but they do not appear to have escaped control until about 1870. By 1920 an area larger than Great Britain was overrun, and the thorny wilderness was increasing at the rate of 1,000,000 acres per annum. Attempts at insect control were advocated by Henry Tryon in 1899, but the Queensland Government did not appoint a Commission till 1912. As about 70 species of insects attack the Prickly Pear in America, the selection of those that might thrive in Australia without transferring their attentions to valuable crops required prolonged experiment, whilst equal care had to be taken to avoid the introduction of the natural parasites of the insects chosen. Of some 143 insects investigated, the most successful has been a moth (*Cactoblastis cactorum*). Its eggs are laid in erect columns of 70 to 150. The larvae in colonies of 20 to 100 burrow in the cactus segments admitting a bacterial infection which destroys them. A cochineal and a red spider are also assisting in the work, but the action of the moth larva is much more rapid, and 30,000 acres of cactus have been destroyed in one district alone. Near Dulacca the area of destruction has increased from 50 to 1000 acres in four months.

The damage done to crops by insects is but little realised by those not in touch with such matters. Dr. Neave's very interesting summary of Economic Entomological data, published in 1930, shows that on a conservative estimate the labour of some 45,000,000 of the population of the British Empire is annually dissipated by the depredations of insects. He makes a most interesting comparison of the British Empire's expenditure and that of the United States in carrying on the war against these small enemies. From this it appears that we are only doing one-seventh of our share of the battle, although we have a far greater responsibility to an Empire "scattered throughout the world, and concerned with a greater range of pests and crops."

Lastly, let us look for a moment on the pathological side of Entomology. Here we are not merely astounded at the devilish ingenuity of the methods by which insects transmit diseases to the human body, but we pay silent tribute to those, by no means a small company, who, knowing well the danger and suffering to which they were liable, have cheerfully risked, and in too many instances lost, their lives. We cannot here dwell on the gradual discovery of the secret of Malaria, from the early suggestions of Beauperthuy in 1853, the discovery of the parasite by Laveran in 1878, Ross's discovery of the same parasite in the body of the mosquito in fulfilment of Manson's prediction, and the final triumph of the experiments conducted in Italy by Low and Sambon, and confirmed by the self-sacrifice of the younger Manson and Warren. We contemplate with ever-increasing admiration Manson's discovery of the mosquito carriage of Filariasis, and with astonishment the diabolical instinct of the Filaria which appears in the peripheral circulation of the human victim only during the hours when the mosquito is at work. Just as Simpson, the introducer of chloroform, and Lister, who cleansed the hospitals of the world, had to face bitter and cruel opposition from their colleagues, so " Mosquito Manson " was at one time a term expressing little else than contempt on the part of his earlier associates. Indeed it is a peculiarly sad reflection that most of the earlier strides in medical and surgical progress have been made, not with the hearty co-operation of the profession, but in face of its vindictive opposition.

The history of the conquest of Yellow Fever and its association with mosquitos is familiar to most of us, and is bound up with the heroic death of Lazear, and the courage of such men as Kissingen and Moran. Lazear's family were awarded a pension of £1 a week, and Kissingen, who became paralysed, was compensated with 15*s*. That these sums were afterwards augmented in response to public indignation does little to redeem that Governmental ignorance of and indifference to Science which is only now being overcome. The £4,000,000 bill for fighting the mosquito seems now but a trifling amount to pay for the completion of a work like the Panama Canal, in comparison with the £50,000,000 in money and the 20,000 lives which were lost before the Entomologist came on the scene.

I have no time to dwell on the transmission of plague by fleas, of typhus by lice, or the attack of the *Dermatobia* fly, which lays its eggs on a mosquito, so that its larvae may be transported to and enter the wound made by their carrier.

My task is nearly done, and I fear very inadequately. You have doubtless been trying to find some reason for such a wandering survey of miscellaneous Entomological items. The reason is partly because this meeting seems a suitable occasion on which to put aside for a moment our individual predilections and look around on our work as a whole—to have, as it were, a chat about our studies, even if it be merely to recall what we already know. But just as some new aspect of a familiar scene may arouse new thoughts on old subjects, so it would seem that occasional wanderings from specialisations may awake us to the rather awe-inspiring fact that in Entomology we are studying Life itself in some of its most stupendous manifestations. Some time ago it was my pleasant duty to give an account of the Class Insecta to a number of students about to be examined in Zoology. I assume that Zoology means the Science of living creatures. In a two-years course the insects were given about nine or ten days, and the week's examination that followed contained about two questions rather indirectly bearing on that class of the animal kingdom which outnumbers in its species all the other known living creatures. It is a little disappointing to find that the significance of Entomological study is in some quarters so little understood.

Doubtless there are some here who have read Sir James Jeans' fascinating works on the astronomical and physical nature of the Universe. Amongst the many rather overpowering impressions conveyed to the reader, none seems to me greater than the apparently minute significance of Life as a phenomenon of Creation. The vast and unimaginable extensions of space and time, sparsely scattered with nevertheless innumerable aggregations of material substance, are almost invariably not merely inanimate, but actually inimical to anything we can understand as life. Most of the stars are so hot that matter cannot remain in orderly cohesion for the millionth of a second. The chance of a star being accompanied by planets is about one in 100,000 after billions of years of stellar life. Even given the existence of planets, those which can support life as we know it must be of the rarest occurrence. Liquids boil in Mercury and freeze in Neptune. Even on Venus the apparent absence of free oxygen seems to preclude the probability of life which its other conditions might support. As the distinguished author of the works referred to says, " Is it (life) the final climax towards which the whole creation moves, for which millions of millions of years of transformation of matter in uninhabited stars and nebulae . . . have been only an extravagant preparation ? Or is it a mere accidental and quite unimportant bye-product of natural processes which have some other and more stupendous end in view ? Or . . . must we regard it as something in the nature of a disease, which affects matter in its old age when it has lost the high temperature and capacity for generating high-frequency radiation with which younger and more vigorous matter would at once destroy life ? Or, throwing humility aside, shall we venture to imagine that it is the only reality, which creates, instead of being created by, the colossal masses of the stars and nebulae, and the almost inconceivably long vistas of astronomical time ? "

I fear these things are too great for us with our present understanding. Whilst we are possessed of that mysterious thing called Life, we are indeed superior to all inanimate things, no matter what their size, temperatures, and unimaginable but insensate physical properties. Except as a comparative conception, size need not dismay us. Twenty parasites in a butterfly's egg may present an organism even more wonderful than a seething mass of irresponsible electrons. Nor is the butterfly's egg a small space except by comparsion, since, if we are to accept the conclusions of the physicists, a globule of water a millimetre in diameter contains a number of molecules sufficient, if placed end to end, to encompass the earth about 227 times.

Time need not overwhelm us. Whilst we possess a conscious existence, it is just before and after. If we cease to be, it also has no existence. Life itself seems to be an intangible property of certain complicated forms of matter. From the movements of Amoeba to the mental processes of the mathematical physicist, its manifestations are as infinitely complex as the molecules in which it resides. By its rarity and indefinable nature it is the most individual phenomenon in an apparently hostile Universe. We cannot, as one of Sir James Jeans' alternatives, imagine that Life is the only reality, since we are conscious of the existence of material things that are quite independent of it. Nor can we argue that material things of which we are not conscious have no existence. The Universe does not cease to be when we are asleep. The poet may aver that the proper study of mankind is Man, but whilst the proper study of mankind is anything that his intelligence can investigate, astronomy included, one of his greatest fields of research must ever be Life itself, and in the insects we shall find it in more varied and surprising forms than in any other class of the animal kingdom. But at the same time we can see a warning in the one direction in which they have failed. After hundreds of millions of years this maintenance of mere life at the expense of the individual may be said to be all that they have attained. Life without individuality brings no achievement. Those, and unfortunately there are many such to-day, who seek, not to encourage individual undertaking, but to reduce all to an inferior level of mere existence, devoid of ambition or reward of enterprise, will be looked upon by a more intelligent posterity as the greatest enemies that have ever hampered human progress. To what that progress leads we do not yet know, but when our planet can no longer support life as we understand it, we shall doubtless have fulfilled a great destiny, whilst the insects, probably the last to go, will have achieved nothing but the maintenance of a scarcely conscious existence.

I began with a quotation from Maeterlinck, I will conclude with one from Holland * :—

“ When the moon shall have faded from the sky, and the sun shall shine at noonday a dull cherry red, and the seas shall be frozen over, and the ice cap shall have crept downward to the equator from either pole, and no keel shall cut the waters, nor wheels turn in mills, when all cities shall have long been dead and crumbled into dust, and all life shall be on the very last verge of extinction on this globe, then, on a bit of lichen, growing on the bald rocks beside the eternal snows of Panama, shall be seated a tiny insect, preening its antennae in the glow of the worn-out sun, representing the sole survival of animal life on this our earth,—a melancholy ‘ bug.’ ”

* 1903, *The Moth Book.*

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OF THE

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